TRANSACTIONS

of the Sixteenth Annual Meeting

of the

PACIFIC COAST OTO-OPHTHALMOLOGICAL SOCIETY



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PACIFIC COAST OTO-OPHTHALMOLOGICAL SOCIETY



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April 18, 19, 20

1928

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Sixteenth Annual Meeting, Pacific Coast Oto-Ophthalmological Society, Santa Barbara, Calif. April 18, 19, 20, 1928 Insert-William Mellinger, M.D., Santa Barbara, California.

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Officers for 1927-1928

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LIST OF OFFICERS

- The first attempt to form a Pacific Coast Oto-Ophthalmological Society was interrupted by the San Francisco fire, and nothing was done. 1906-
- A number of oculists from all parts of the Coast being in San Francisco to attend the Lane Lectures, given at that time by Prof. F. Fuchs, a meeting was called after one of the lectures by Dr. C. Welty and Dr. H. Barkan, and a permanent organization was formed with Dr. J. F. Dickson, Portland, as President; Dr. W. H. Roberts, Pasadena, Vice-President, and Dr. C. F. Welty, San Francisco, Secretary-Tressurer. 1911-Treasurer.
- A meeting should have been held in San Francisco, but the President, Dr. Dickson, was absent in Europe. The Secretary of the California State Society was to arrange for a meeting in connection with the State Society meeting. It was felt that this arrangement would cause the newly formed Pacific Coast Society to lose its identity and the suggestion was refused. The officers held over until the next year. 1912-
- 1913-First annual— Pressident, Dr. John F. Dickson, Portland. First Vice-President, Dr. William H. Roberts. Secretary-Treasurer, Dr. C. F. Welty, San Francisco. Meeting held July 1, 2 and 3, 1913. Guest, Dr. A. E. Davis, New York City.
- Second annual meeting was held at Seattle, July 14, 15 and 16, 1914. President, Clinton T. Cook, Seattle. First Vice-President, Ed E. Maxey, Boise. Second Vice-President, John F. Beaumont, Portland, Oregon. Secretary-Treasurer, C. F. Welty, San Francisco. Guest, Dr. Robt. H. Elliott, London, England. 1914-
- 1914-1915—President, Hayward G. Thomas, Oakland, California.
 First Vice-President, W. K. Seelye, Portland.
 Second Vice-President, R. A. Fenton, Portland.
 Secretary-Treasurer, Cullen F. Welty, San Francisco.
 Third Annual Meeting, San Francisco, June 15, 16 and 17, 1915.
- Secretary Treasure.
 Third Annual Meeting, San Treasure.

 1915-1916—President, Joseph L. McCool, Portland.
 First Vice-President, A. R. Irvine, Salt Lake City.
 Second Vice-President, George W. McCoy, Los Angeles.
 Secretary Treasurer, Ralph A. Fenton, Portland.
 Fourth Annual Meeting, Portland, June 22, 23 and 24, 1916.

 A. Veasey, Spokane.
 Lordan, San Jose.
 Diego.

- 1922-1923—President, William Humes Roberts, Pasadena.
 First Vice-President, Kaspar Pischel, San Francisco.
 Second Vice-President, A. W. Morse, Butte.
 Secretary-Treasurer, C. Benson Wood, Los Angeles.
 Eleventh Annual Meeting, Los Angeles, June 21, 22 and 23, 1923.
- 1923-1924—President, Frederick A. Kiehle, Portland, Oregon.
 First Vice-President, Arthur C. Jones, Boise, Idaho.
 Second Vice-President, R. A. Green, Spokane, Wash.
 Secretary-Treasurer, C. Benson Wood, Los Angeles, California.
 Twelfth Annual Meeting, Portland, Oregon, June 19, 20 and 21, 1924.
- 1924-1925—President, H. M. Cunningham, Vancouver, B. C. First Vice-President, C. Benson Wood, Los Angeles, California, Second Vice-President, Hans Barkan, San Francisco, California, Secretary-Treasurer, Walter F. Hoffman, Seattle, Washington.
- 1925-1926—President, Kaspar Pischel, San Francisco, California. First Vice-President, Glen Campbell, Vancouver, B. C. Second Vice-President, E. M. Neher, Salt Lake City, Utah. Secretary-Treasurer, Walter F. Hoffman, Seattle, Washington.
- 1926-1927—President, Carroll Smith, Spokane, Washington.
 First Vice-President, William Mellinger, Santa Barbara, California.
 Second Vice-President, Frank Burton, San Diego, California.
 Secretary-Treasurer, Walter F. Hoffman, Seattle, Washington.
- 1927-1928—President, William Mellinger, Santa Barbara, Calif.
 First Vice-President, Robert R. Hampton, Salt Lake City, Utah.
 Second Vice-President, A. T. Wanamaker, Seattle, Wash.
 Secretary-Treasurer, Walter F. Hoffman, Seattle, Wash.

(The Secretary will be grateful for corrections and additions to the above.)



The Seventeenth Annual Meeting Will be Held in Salt Lake City, Utah.

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SCIENTIFIC PROGRAM

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Wednesday, April 18, 1928

The Sixteenth Annual Meeting of the Pacific Coast Oto-Ophthalmological Society was called to order in the Recreation Center at 10:10 A. M. by the President, Dr. William J. Mellinger, Santa Barbara, Calif.

REGISTRATION

PRESIDENT'S ADDRESS

Dr. William J. Mellinger, Santa Barbara, Calif.

Bronchoscopy and Esophagoscopy with Case Reports

Dr. Alphonso N. Codd, Spokane, Wash.

Discussion opened by Dr. Harrington B. Graham, San Francisco, Calif.

Foreign Bodies Removed by Per Oral Endoscopy

Dr. Charles Wm. Brown, San Diego, Calif.

Discussion opened by Dr. Simon Jesberg, Los Angeles, Calif.

Otitis Media, Its Complications, Management and Treatment Dr. J. Thomas Dowling, Seattle, Wash.

Discussion opened by Dr. C. Benson Wood, Los Angeles, Wif.

Keratosis Obturans of the External Ear (Cholestestonia of the External Ear)

Dr. H. S. Muckleston, Los Angeles, Calif.

Discussion opened by Dr. Walter Crane, Los Angeles, Calif.

Electronystagmography
Dr. I. Leon Meyers, Los Angeles, Calif.

Thursday, April 19, 1928

The Comparative Value of Glaucoma Operations Dr. Lucier C. Peter, Philadelphia, Penn.

Cataract Operations in Diabetics—Results in Sixteen Operations ... Dr. Roderick O'Connor, Oakland, Calif.

Fracture of the Optical Canal

Otto Barkan and Hans Barkan, San Francisco, Calif.

Discussion opened by Dr. A. C. MacLeish, Los Angeles, Calif.

Glaucoma, An Historical Review Dr. Kaspar Pischel, San Francisco, Calif. Discussion opened by Dr. Ralph A. Fenton, Portland, Oregon

Radium Therapy in Vernal Catarrh Dr. Frederick C. Cordes, San Francisco, Calif. Discussion opened by Dr. Walter Scott Franklin, Santa Barbara, Calif.

The Diagnosis of Motor Palsies Dr. Joseph L. McCool, Portland, Oregon Discussion opened by Dr. Dohrmann K. Pischel, San Francisco, Calif.

Photography of the Human Fundus Oculi Dr. George N. Hosford, San Francisco, Calif. Discussion opened by Dr. A. Ray Irvine, Los Angeles, Calif.

Friday, April 20, 1928 9:00 A.M.

The Relation Between the Sub-Epithelial Connection Tissue (Mesenchyma) with the Marrow Spaces in Embryos and Infants Dr. Norval H. Pierce, Chicago, Ill.

Submucous Resection in Children

Operative Cure of Chronic Suppuration of Maxillary Sinus, Including

Wash.

all, San Fractico, Calif.

ation of Maxillary Sinus, Incharistical H. Harter, Seattle, Wash.

All Harter, Seattle, Wash.

All Discussion opened by Dr. English Barbara, Calif.

Discussion opened by Dr. English R. Lewis, Los Angeles, Calif.

Inflammation in the Nasal Accessory Sinuses as Revealed by the Roentgen Ray

Dr. Robert Newell, San Francisco, Calif.

Discussion opened by Dr. H. B. Graham, San Francisco, Calif.

SIXTEENTH ANNUAL MEETING

OF THE

PACIFIC COAST OTO-OPHTHALMOLOGICAL SOCIETY

HELD AT SANTA BARBARA, CALIFORNIA April 18, 19, 20, 1928

4 4 4

The meeting called to order by Dr. Mellinger.

We are assembled here for the purpose of holding the Sixteenth Annual Meeting of the Pacific Coast Oto-Ophthalmological Society. Santa Barbara extends to each of you a hearty welcome and hopes you will enjoy your visit here as much as we enjoy having you with us. This is the first time in the history of this Society that a meeting has been held outside of the larger cities, and I hope the experiment will be a profitable one, and that you will see fit to meet here with us again sometime in the future.

I am glad to see so many of the younger men here, also the older men, but it is to the younger men that we must look to carry on the work of the future. There has been a great deal of work accomplished in the past, but there is a greater amount of work to be done by us in the future.

I take this opportunity to thank all who have so kindly and generously helped me during the year, and also to thank the men who have traveled so far to make this meeting a success, and also I want to express my appreciation for the honor conferred won me. It is indeed an honor to be selected by your fellow members to serve them as president.

Now, at this time I am going to vary somewhat from the usual procedure and ask our honorary member, D. Edward Jackson, to give the opening address the opening address.

Dr. Edward Jackson, Denver, Go

Mr. President, members of the Oto-Ophthalmological Society and guests: I should say that the beynote speech for a medical society ought to be characterized by previty. It is a point in policy and conduct in etiquette that can't be unduly emphasized in medical meetings, so I will try to make the coint at least.

I came because to to attend the meetings of this Society, not merely as a specimen for the museum of curiosities, as one of the oldest members, or to show that one who was at the first attempt to found this Society in San Francisco in 1906 has survived and can survive. I look to this a great many who are forward-looking in science and in other line of endeavor in our civilization look to the West. Already it is beginning to be demonstrated that the tide of thought as well as Digitized by the the of empire westward takes its way; that in the conditions of

the relatively new country are offered the opportunities for advances, and I think that those opportunities are very great for this Society.

I heard Booker Washington when he was the head of Tuskogee Institute, and remember this sentence that he used with reference to the education of the negro—that the negro has the advantage of his disadvantages, and in that way the Hampton Institute in Tuskogee led the movement that is now nation-wide in manual training, vocational training, that is now recognized even in colleges and universities. of the state universities there has been established in the last two years a course for which collegiate credit is given in brick-laying. memory goes back far enough to realize that there is an enormous change in the sentiment of educators, and the same obstacles which hinder advance in old communities in material lines hinder them in newer communities, but to very much less extent, and that is the hope for the Pacific Coast Oto-Ophthalmological Society.

There are a good many problems that ought to be taken up soon. One of them is that these specialties should not be considered surgical specialties. I suppose we all remember the stage in our under-graduate medical course when we were going to be surgeons. Mine lasted until I was out of the medical school, and my first notes of what I considered important cases were surgical cases, like tying an ulnar artery and treating a fractured wrist and things of that sort, but I outgrew it, and it seems to be that Ophthalmology and Laryngology have about reached a stage of specialties when they should outgrow being regarded

If the administrators of medical colleges and universities, in order to simplify their administrative machinery (that is what it is for), must attach these specialities to some of the veteran divisions of medicine and surgery, they better place us with the medical den than the sur-

geons. I believe that thoroughly, for our future advance.

Things of that kind can be better done on the Pacific Coast than anywhere else in America, and changes of the sort are easier to make in America than anywhere else in the world, and that is one, perhaps

the so be su and my fingical cases, in and things of ophthalmology and atties when they should administrative machinery (that is pecialities to some of the veteran of they better place us with the medical better that thoroughly, for our future to make the sort a America, and changes of the sort a America than anywhere else in the world, and that the great reason, for my keen interest in this Society.

Bronchoscopy and Esophagoscopy with Case Reports

Alphonso N. Codd, M. D., Spokane, Wash.

"The time has passed when the lodgment of a foreign body in the air and food passages is considered as a curiosity of medicine."—

McCrae.

The various schools of Endoscopy throughout the world have accomplished much in recent years toward placing this science in the lime-

light of modern medicine and surgery.

In our country, the names of Chevalier Jackson and Bronschoscopy are almost synonymous. Doctor Jackson, of Philadelphia, has spent forty-four years of his life, ever since his graduation from Jefferson Medical College, in 1884, solely in the interests of Endoscopy. His monumental work in this field has laid the foundation and built the structure of many of its modern phases.

New etiological and pathological factors in chest diseases have emanated from his clinics. His work has inspired the internist and the roentgenologist to the study and interpretation of new physical signs and symptoms. Diagnosis of endoscopic problems has been greatly enhanced. The problem of the non-opaque foreign body has been thoroughly studied. The phenomena resulting from obstruction of the air passages has been placed before the profession. Thorough knowledge of the mechanism of obstructive emphysema, obstructive atelectasis with their signs and symptoms have made the diagnosis of non-opaque foreign bodies in the lung most accurate.

Obstructive emphysema is a common condition found when a child chokes on a peanut kernel. Fluoroscopy shows the diaphragm flattened, depressed and less excursion on the invaded side; at the end of expiration the heart and mediastinal wall move over toward the uninvaded side. The invaded lung becomes less dence than the uninvaded lung from the trapping of the air by the expiratory "valve-like effect" of obliteration of the "forceps spaces" that during inspiration afford air ingress between the foreign body and the swollen bronchial wall. Air gets in and cannot get out. This partial obstruction causes obstructive emphysema which must be distinguished from compensatory emphysema in which the ballooning is in the unobstructed lung, because its fellow is wholly out of function through complete corking of the main bronchus of the invaded side. (Lighuer-Manges.)

Obstructive ateretasis (Manges) occurs when the obstruction is

Obstructive atelectasis (Manges) occurs when the obstruction is complete; the air below the obstruction is absorbed, the lung collapses and the mediastroum moves over to satisfy the vacuum. The roentgen ray is the thost valuable diagnostic means, but careful notation of physical sees by an expert should be made in all cases. Expert ray work will show all metallic foreign bodies and many of less density such as teets, bones, shells, buttons, etc. If the ray is negative for foreign

igitized by

body but indicates bronchial obstruction, a diagnostic bronchoscopy should be done.

Endoscopy associated with the necessary aid of the internist, the roentgenologist, the pathologist and the surgeon makes a formidable team. Its modern uses are many: The direct observations on the motility of the larynx and on new growths, strictures, diverticula, and spasms; the removal of tissues for biopsy and diagnostic aspirations of secretions from distal cavities without contamination. A means for the proper instillation of radio-opaque substances such as lipiodol and bismuth subcarbonate to aid X-ray diagnosis; the aspiration of lung abscess and bronchiectatic cavities, and the insufflation of medicine directly; the removal of foreign bodies and new growths and the treatment of pathological and functional disturbances.

The more recent development of Endoscopy is the treatment of lung suppuration, lung abscess, bronchiectasis, occasionally bronchial asthma, but not tuberculosis. Weekly aspirations of purulent secretions followed by medication directly, either by swab or instillation. A number of therapeutic agents have been used—Monochloro phenol one-half per cent solution is used in the Jackson clinic. (Manges prefers bismuth subcarbonate as an aid to roentgen ray diagnosis.) This treatment is fulfilling an old surgical principle "where there is pus there should be adequate drainage." The amount of purulent excretion coughed up by the patient is greatly reduced by simple bronchoscopic aspiration. When medication is supplemented, the cough usually ceases for three or four days. As rest is very necessary in the treatment of any lung condition—this becomes an added asset.

The cure of lung abscess is greatly hastened. Old cases of bronchiectasis have not been cured but have been greatly dieved. In early cases much more favorable results are obtained.

Many who have seen Dr. Jackson remove a foreign body from a lower bronchus in a few seconds time without anesthesia, have proclaimed him a wizard: One day Sir St. Clair Thomson, after watching him remove an open safety pin from the bronchus of a small child, said: "You Americans trust too much in Providence, but this man Jackson goes beyond Providence." However, not in the least detracting from the honor rightfully due Professer Jackson, if you stop to analyze his successes, you instead encounted a wonderfully well developed science, planned with the greatest attention to the most minute detail. A close study of the failures of Bronchoscopy with well thought out remedies; for example whether or not there is a clasp over the spring of a safety pin, which, if present presents a more difficult problem in its removal. Instruments clevered devised to change the axis of a straight pin or tack imbedded in a bronchial wall—principles such as "advancing points perforate trailing points do not." Practice on the maniken, the cadaver and the dog for the beginner developing "nerve cell habit," etc.

So completely is this technique developed that any man of ordinary skill; provided he takes the time and energy to study the principles and continually practice them, should be able to do good Endoscopy.

"Education of the eye and fingers" is paramount. It is just as difficult to do good Bronchoscopy without practice as it would be to take up a violin for the first time and play a selection from one of the old masters of music.

The removal of a foreign body should never be attempted without first following a definite procedure. Diagnosis is paramount and sufficient time should be taken for it. Seldom is the removal of a foreign body an emergency unless there is considerable obstruction with danger of suffocation. Next, procure a foreign body of similar size and shape and place it in a manikin for practice. It is useless to attempt it if you cannot succeed in removing the foreign body from the manikin. Peanut kernels break easily when clamped with heavy forceps.

Staples must be inverted, as they usually point upward. The sharp point of an open safety pin must be guarded and the best method must be selected for its removal.

As to anesthesia, we use absolutely none in children. In adults a preliminary hypo of morphine is given an hour before Endoscopy. A few minutes before, a swab of ten per cent cocaine solution is introduced into the right and left pyriform sinuses. If the bechic reflexes are not controlled a swab of cocaine is then introduced between the cords into the trachea.

Reactions to be looked for in prolonged Bronchoscopies, especially in cases of vegetable foreign bodies, is sub-glottic edema occurring usually eight to twelve hours later. Typical signs of this condition are those of intense laryngeal dyspnea of the inspiratory type; marked indrawing at the supra sternal notch and at the ensiform on each inspiration, cyanosis is usually present but not as common as might be expected. Intubation is not the treatment but when the condition becomes urgent a low tracheotomy is absolutely indicated. This complication must always be prepared for.

It is the prediction of men deeply interested in this work that the next two decades will bring about a revolutionized treatment, both medical and surgical, in diseases of the lung

I have selected a group of my own cases to report. In reporting them, I wish to credit my two co-workers, Drs. Carroll Smith and W. R. F. Luke, for their hearty co-operation in the handling of these cases.

Case Report No. 1—Foreign Gody (coin) in the Esophagus.

Boy, aged four, referred Dr. H. E. Wheeler.

History: Choking attack while playing with coins two days ago. Pain on swallowing wind swallow liquids and semi-solids. X-ray showed metallic disc size of a quarter in the lateral plane at the level of the supra sternal rotch.

Esophagoston without anesthesia and removal of quarter dollar from below to fold of the crico-pharyngeus, using rotation forceps. Time—two minutes.

Comment: Discs shown by X-ray in the lateral plane are in the

Esophagus and not in the Trachea. They most usually lodge just below the crico-pharyngeus muscle.

CASE REPORT No. 2—Foreign Body (wheel from toy auto) in the Esophagus.

Boy, aged three, referred by Dr. Paul Weisman.

History: Choking attack ten days ago and pain in the supra sternal regions. Dysphagia for solids. Accompanying X-rays showed disclike metallic foreign body at the level of the supra sternal notch. Esophagoscopy done elsewhere under Ether anesthesia. No foreign body was encountered.

Condition on Admission: Temperature 103 degrees. Slight subcutaneous emphysema of the tissues of the neck. X-ray showed disclike metallic foreign body size of a nickel with a sharp projection from the central axis about four mm. long. Disc is in the lateral plane below the level of the supra sternal notch.

Treatment: Ice packs to neck and rectal feeding. Iced liquids by mouth. Subcutaneous emphysema and fever subsided in three days and the next day Esophagoscopy was performed. Toy lead wheel with sharp attachment of solder projecting from its central axis was encountered below and partially behind the fold of the crico-pharyngeus muscle. With rotation forceps the foreign body was dislodged by pushing it down till the upper rim came into view. By advancing the esophageal tube mouth so its lip protected the solder projection, the foreign body Symptoms subsided immediately. Duration—three was removed. minutes.

Comment: The presence of subcutaneous emphysema and fever are complications more important to be dealt with properly than the hurried removal of the foreign body. Attempted removal too soon might have proved fatal.

CASE REPORT No. 3—Foreign Body (bolus of meat) in the Esophagus.

Woman, aged sixty.

Woman, aged sixty.

History: Consulted me three days after choking on piece of liver. She complained of painful attempts at swallowing and soreness in left side of neck at the level of the sapra sternal notch. Complete aphagia for past twenty-four hours of ever 101 degrees. X-ray showed lodgment of barium mixture in upper Esophagus with violent contractions of the muscles on attempted swallowing.

Treatment: Ice a dications to neck and rectal fluids were instituted over night. Temperature was normal in the morning and Esophagoscopy was performed. Anesthesia—10 per cent cocaine solution—applications into left pyriform sinus, morphine sulphate gr. 1/4, atropine sulphate g1/150, one hour previously. I encountered more than usual resistance at the crico-pharyngeus. By gentle pressure with the tube muth the muscle relaxed and the tube entered the Esophagus. Inspection of the upper Esophagus revealed much swollen mucosa. Sigitized by remainder of the Esophagus, including the hiatus, had a normal

appearance. No evidence of stricture or neoplasm found. I removed the tube, thinking I had dislodged the foreign body on passing the upper pinch-cock and that it had gone down into the stomach. The patient swallowed liquids and solids easily for the following twenty-four hours. Then she developed complete aphagia again. The soreness in the neck was present throughout. A second X-ray study revealed the same findings as the first. A second Esophagoscopy was performed the following day. Upon careful examination at the upper pinch-cock, I detected a small brownish mass behind a fold of mucosa below the muscle on the posterior wall. I dislodged it by pulling down, and was surprised to find a foreign body of large size in the invaginated posterior crico-pharyngeal fold. With side curved forceps, I removed it and all symptoms subsided.

Comment: Overriding a foreign body in the upper Esophagus is easily done and should be guarded against by careful inspection of the posterior fold of the crico-pharyngeus. This is a common site for foreign bodies to lodge in the Esophagus when there is no pre-existing pathology present.

CASE REPORT No. 4—Spasm of the Crico-Pharyngeus Muscle.

Man, aged thirty-three.

Complaint: Chokes on liquids—chronic cough. Onset seven months ago, following influenza.

Past History: Negative. General health good. Wassermann negative. Urinalysis negative. Sputum examination negative for tubercle bacilli. Sputum contains many streptococci and staphylococci.

Present Condition: Choking attacks after swallowing liquids, no difficulty with solid foods. Cough and purulent sputure exociated with choking attacks. Sinuses, teeth, tonsils negative. Neurological examination negative. Chest examination negative except for occasional coarse rales at right base. X-ray examination of thest following instillation of lipiodol showed beginning Bronchiectars right lower lobe; otherwise negative. Fluoroscopy of swallowing function: Entirely negative throughout during the act of swallowing However, the crico-pharyngeus muscle was seen to go into spasmodic contraction, closing tight the upper pinch-cock and causing the last low drops of barium in the hypopharynx to enter the larynx, setting up an attack of coughing.

Esophagoscopy: Preceded by hypo of morphine sulphate gr. ¼ and atropine sulphate gr. 1/150 and local application of ten per cent cocaine solution into the right proform sinus, was performed. The cricopharyngeus muscle was rigidly contracted and remained so longer than usual. It eventually bened with gentle pressure by the tube mouth. No organic lesion was encountered throughout the Esophagus. No adhesion could be found at either the upper or lower pinch-cocks. The hiatus opened beadily, no evidence of pulsion diverticulum present.

Diagrams: Functional spasm of the crico-pharyngeus causing partial liquid, aphagia with resulting aspirations into the tracheo-bronchial

tree. This aggravated condition of several months' duration being the underlying factor in the resulting Bronchiectasis.

Treatment: By the employment of the principle of the Plummer water bag for the treatment of so-called cardio spasm, a somewhat similar bag constructed on a No. 22 French catheter without the use of a stylet, was used. It was introduced into the pharynx and the patient instructed to swallow it into the Esophagus. Taking the distance of 16 cm. from the upper incisor teeth to the crico-pharyngeus muscle, the bag was permitted to go down well through this opening. The crico-pharyngeus opening was then dilated by water pressure introduced into the bag up to twelve pounds all the patient could stand. This procedure was followed by complete relief from the choking attacks for several days. It was necessary to follow this treatment several times at weekly intervals, and not until the patient could stand fifteen pounds pressure did the choking attacks stop permanently.

Comment: This rigidity of the upper pinch-cock has been described by Jackson as a bone-like hardness which led early Esophagoscopists to think it was the cricoid cartilage that was encountered. He demonstrated, however, that the resistance was on the posterior wall and was due to the orbicular muscle fibres that are essentially different in power and action from either the circular fibres of the Esophagus or the oblique fibres of the inferior constrictor.

Case Report No. 5—Foreign Body (fence staple) in Left Lower Lobe Bronchus.

Boy, aged sixteen, referred by Drs. McCormack and Barnett.

Complaint: Cough and purulent sputum for eight years.

History: Diagnosis of pulmonary tuberculosis had been made on account of chronic cough. Patient had been in two sanitaria in Canada but no X-ray examination had been taken and no sputum examined. X-rays ordered by Drs. McCormack and Ramett revealed a fence staple in left lower lobe bronchus with points appeared and below the level of the crest of the diaphragm posteriorly multiple abscesses around it. No X-ray evidence of tuberculosis. Oputum examination negative for tubercle bacilli.

Past History: Boy remembered choking on several staples at age of eight, but thought he spit them out.

Problem: To do a version of the staple and remove it through the bronchoscope.

Procedure: I coured a staple similar in size and placed it in a manikin for practice for several days. When I could accomplish a version of a similar staple easily in the manikin, I proceeded to do a Bronchoscopy. Anesthetic—preliminary hypodermic of morphine sulphate gr. 1/150, cocaine solution ten per cent into pyriform sinuses and into Trachea. Used a 7 mm. bronchoscopia and side curved forceps; also used fluoroscope as valuable aid in this case. Aspirated considerable pus from abscess around staple and

had considerable difficulty turning staple end for end without undue trauma. This accomplished, its removal was easy. Time of operation —one hour and forty minutes.

Result: Patient stood ordeal very well. No fever following operation; slight sub-glottic edema for two days due to prolonged instrumentation. Profuse expectoration of pus for several days aided by postural treatment. X-ray two weeks later, showed marked diminution in size of abscess cavities. Patient gained twenty pounds in weight during subsequent three months, and cough stopped.

CASE REPORT No. 6—Foreign Body (glass bead) in Trachea.

Boy, aged two, referred by Dr. T. E. Hoxey.

Complaint: Choking attack while playing with glass beads two days

ago.

Present Condition: Fever 103 degrees. Many coarse rales heard all over chest. X-ray showed foreign body in Trachea at corina about 1 cm. in length resembling a bead. A duplicate of the bead produced. by the mother showed heavy lead paint coating which showed in the X-ray. The duplicate was placed in a manikin and forward grasping bead forceps used for trial removal. On the first grasp with the forceps the bead crushed.

Bronchoscopy: Without anesthesia and removal of bead with bead forceps. Time of operation—two minutes. Uneventful recovery.

Comment: Glass beads are apt to crush easily and fragments are very difficult to remove.

REFERENCES

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Tucker—Observations on Fifty Cases of Foleign Bodies in the Air Food Passages, 1924. and Food Passages, 1924.

Discussion opened by Dr. Harrington B. Graham, San Francisco, Cal.:

No paper on Bronchoscopy or Exphagoscopy is complete without a reference, of course, to that master who has developed the art—Dr. Jackson. One wonders if medicine has ever produced a man who is as complete a doctor and as interesting a character as Dr. Jackson. He represents, I think, what the medical profession hopes for—a real doctor as well as a specialist. Think particularly that the specialists have reason to study the life of Dr. Jackson in order to see what they themselves should be, and think that we can all of us learn a great deal concerning the art of the practice of medicine.

Dr. Jackson has had a single idea in view throughout his whole life—becoming a general practitioner at the same time that he has developed his practice of medicine.

aight Zed by The alliance that Dr. Jackson has made in his later life with Dr. McCrae has shown us the way to link up each one of our specialties with general medicine. Dr. McCrae, of course, is the successor of Dr. Osler in his general principles, and is one of the greatest diagnosticians that America has, and his alliance with Dr. Jackson has given Dr. Jackson a chance to broaden the specialty in such a way as to make it one of the largest branches of the whole medical practice.

In my experience it is too frequently the case that the specialist comes from college, starts out to practice ear, nose and throat, or eye, or some other line, and knows nothing about the general principles of medicine and doesn't make any attempt to apply the general principles to his specialty. There are too many of us of that type. Dr. Jackson represents exactly the opposite, and all of us wish to pay our respects to this artist in our line.

The place that Bronchoscopy has in medicine, I think, is more in the future along the line of general diagnosis than it is in the line of removing foreign bodies in the esophagus and bronchus. Medicine has owed a great deal to the X-ray for its advancement in later years and the diseases of the lungs and the diseases of the chest in general as well as probably the diseases of the stomach are going to owe a great deal in the future to the work that Dr. Jackson has started.

I have for a number of years claimed that this line of work should take the same place that the X-ray has in general medicine and that we should have men in each community who do absolutely nothing except help the diagnostician in his work through the art of Bronchoscopy and Esophagoscopy, and I am hoping in the near future that each large community, such as Los Angeles and San Francisco, will have a diagnostic clinic with not one man, but several men, connected with it who do not do anything else except develop this line of work. I say "develop" because it is only in its infancy and I think that the quicker the universities take hold of this line of work and introduce the general principle of a diagnostic clinic the farther along will this subject get.

My time will not allow me to go into a general discussion of all of the cases that the doctor has given but one that has interested me quite recently is that of a massive of lapse of a lung. He gives these figures of the diaphragm showing how the emphysema occurs. It is very interesting to note that in the literature all massive collapses of the lung have occurred through a blocking off of one portion of bronchus. That is not the only way that a massive collapse of the lung can occur. It can also occur through perforation in the pleural cavity. This may occur through abscess formation from the long standing presence of the foreign body, or it may occur directly by the foreign body itself entening the pleura. I have one case, probably the only case on record; the only case I can find on record, that entered the bronchus and in two days and a half wormed its way through the lung into the pleura. The method by which we get the massive collapse is the formping of air through the opening into the pleura and the collapse of the lung to such an extent in this case that the mediastinum

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was shoved to the right side, the left side having been perforated. It was a very interesting case where a diagnosis was not made and where the case had died and had autopsy and recovered the foreign body in the pleura later on. This case will be published at a future date.

Dr. Jackson has made use of the X-ray in the extraction of foreign bodies to some extent, but there are others who use the X-ray very frequently in the extraction of foreign bodies. Those of us not so skillful as Dr. Jackson in locating the foreign body or extracting it, find a great deal of help in the X-ray. Here is an instance of one case where there was an enormous amount of pus and where it was nearly impossible to get the pus out of the lung before finding the foreign body. I put the man directly under the X-ray, introduced my bronchoscope, and under the X-ray alone wormed the bronchoscope to the foreign body, and with the forceps being guided by the man on the outside to the foreign body, grasped the foreign body, rotated the foreign body and brought it out without ever seeing it.

With regard to anesthesia in choking, it is all very well, as I have said before in one of my articles, for a skillful man to say that we should not use anesthesia in choking. For those of us not so skillful, I think it is a grand mistake. Children are going to suffer. We don't suffer at all, but the children suffer very severely. I have made children suffer and I have seen other bronchoscopists make them suffer from the non-use of anesthesia where if they had put the child under the anesthetic they would have gotten in with very little trauma to the child and the foreign body rescued without doing the child any damage. I think it is a mistake for a very skillful man like Dr. Jackson to advocate that the unskillful bronchoscopist, and there are a lot of its around the country, should try to pass a bronchoscope without desthetic in children.

Dr. F. M. Shook, Oakland, Calif .:

Dr. Graham's point about developing one man in each community impresses me very strongly. In the Oakland Mation, there are about five or six who carry from one to two thousand dollars worth of instruments and probably get three to five or six foreign bodies and diagnostic cases a year. All of us handle them with just about the same degree of skill, or lack of skill, and it impresses me that it would be so much better if one man and his associate would take up that work and concentrate on it.

It takes a population of half a million to give a man enough work to become reasonably skillful. As far as I myself am concerned, I would be very glad to hand wormy instruments to a man who wants to take that work up; would but him on the back, wish him joy and give him all my cases.

Dr. O. R. Gullion, Eugene, Ore .:

Regardin The particular remark that Bronchoscopy has a place in scientific incidicine, I want to state that it also has a place in society. This last winter, following a bridge party, they lost the score. Four

days later I recovered the score card in the right bronchus of one of the ladies.

Dr. Robert B. Karkeet, Portland, Ore .:

The doctor from Oakland said he would be glad to give the doctor a pat on the back and wish him joy. That is about all a bronchoscopist does get when he removes a foreign body. These things are prone to happen with people who are poor.

One thing Dr. Codd said I want to emphasize. In many of the cases there is no emergency. I think men are prone to rush a child to the hospital and to get at this foreign body as soon as possible without adequately working out the case.

Another thing is that teamwork is absolutely necessary. No one man can do good work unless he has trained associates or assistants.

There are two cases of foreign body that I had that were rather interesting to me. They were two cases of wire that had evidently come from a wire brush that was used in cleaning a pan. Both of the wires were about three inches long and both lodged in the right bronchus. One had been cooked in a pancake and the other was in some string beans. I had never come across such a foreign body in any of the literature and it was interesting to note that such a thing might occur.

Dr. Chester Bowers, Los Angeles:

I think the essayist is to be congratulated on swinging these out so rapidly. I was quite embarrassed to hear of them being removed in two or three minutes. Then he ran across the one that took an hour and a half and I felt a little better, because I have many of that kind.

There are two or three difficulties that he emphasized that we all find, and one is the embarrassment of overriding at foreign body in the esophagus. It seems so simple in looking at the X-ray or seeing the shadow of the nickle or penny in the esophagus, and we are quite confounded to not see it through the esophagoscope, and to go back, we either see it or find it is not there and we are very much pleased the next morning to radiograph the patient and find it in the stomach.

I had an interesting case of paper clip with the two points sharp, each point being about as sharp as a razor.

FOREIGN BODIES REMOVED BY PER ORAL ENDOSCOPY

Charles Wm. Brown, M.D., San Diego, Calif.

In preparing this paper there has been no intention of producing new ideas in Per Oral Endoscopy and no new instruments in its practice. The author hopes to show to you and to impress upon you a few facts that have been repeatedly expressed in books and other contributions from The Bronchoscopic Clinic of that great workman and scholar, Doctor Chevalier Jackson, and his Associates. It was in his Clinic and his teaching that gave me a desire to try to do good and efficient work by continuous practice on other than the human body.

In 1923, while in Vienna, I had the pleasure of working several months with Doctor Haslinger in the Hajek Clinic. The work in the two clinics is done in an entirely different manner and with different instruments, as you all no doubt know, and yet both clinics doing

excellent work.

Time is quite a factor in this work, and those of you situated in a population of one hundred and fifty thousand or less, as I am, know that it is difficult to have good team work. It is my desire—having within the past year organized a Clinic for Eye, Ear, Nose and Throat—to have the team now formed to continue to improve in its work and efficiency in Per Oral Endoscopy.

No. 1-L. S., 80. 5-12-1926. Rabbit bone in cricoid narrowing.

History: Eating rabbit for breakfast this morning and felt a piece of bone in throat. Wearing full set of false teeth and did not notice bone in mouth at time of swallowing.

Examination: Indirectly, unable to find evidence of foreign body.

Local Anesthesia—With pharyngoscope and alligator forceps removed small triangular piece of bone from cricoid narrowing, right side. Sitting posture.

Duration of bone in situ—three bours. Time of removal—one minute.

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Plate 1, No. 1.

No. 2—Mrs. R., 55. 2-24-192. Fishbone in cricoid narrowing.

History: Eating fish residence and having false teeth in mouth did not know bone was in mouth until swallowed. A lump is in throat just below breast bone with swallow, and feels sticking when swallow.

Examination: Patient very excitable; easily nauseated. Painted throat with ten per cent alcoholic cocaine solution and examined with mirror. Unauto to find any bone or erosion.

Phary persopic Examination: Hypopharynx examination, no bone found, then at beginning of esophagus could see bone in transverse position when patient swallowed.

Advanced scope and removed bone, 11/4 inches in length, with alli-

gator forceps.

Duration of bone in situ-about five hours. Time of removalless than five minutes from beginning. No X-ray taken, as this was Sunday afternoon.

Plate 1, No. 2.

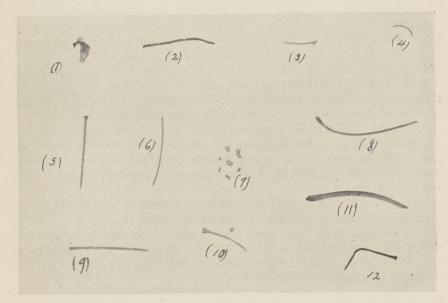


PLATE 1

No. 3-A. L., 66. 3-9-1927. Chicken bone in critotal

Eating chicken this noon when bone became lodged in throat. Reported at office for examination, complaining of pain and scratchy feeling in hollow of neck when swallowing. Patient very excitable. Short, fat Jew, male, with very thick neck

Gave morphine grain 1/4, scopolarine grain 1/150, and within one hour cocainized throat and removed straight, narrow bone, one inch long, from cricoid narrowing with pharyngoscope and alligator forceps.

Duration of bone in situ-two hours. Time of removal—one min-ute. Soreness entirely disappeared within twenty-four hours.

Plate 1, No. 6.

No. 4-E. C., 22 Non Phs. 2-7-1925. Peanut in right bronchus.

January 31, 1925. Child had been to hospital for pneumonia. On admission child had been to hospital for pneumonia. On admission child had been to hospital for pneumonia. On admission child had rattle in the lungs.

Temperature, 99.8. Pulse, 110. Respiration over both lungs. Slight bronchial

breathing over right lung, anterior. Small amount of large moist rales heard over right lung.

X-ray, 2-7-1925: Considerable inflammatory reaction around lower right bronchus which is probably site of foreign body. Dr. L. C. Kinney.

Bronchoscopic Examination: Right bronchus shows edema and ulcerations with granulations. Through granulations reveal white foreign body, which was macerated.

Removal of peanut in four pieces, using bronchoscope and long straight grasping forceps.

Duration of peanut in situ—about one week. Time of removal—

thirty minutes.

Following removal of foreign body child continued with pneumonia, having a temperature varying from 100 to 104, with usual symptoms.

X-ray, 2-20-1925: Chest shows pneumonia, right base. Recovered and discharged from hospital, 2-28-1925.

Plate 1, No. 7.

No. 5—Mrs. I. F., 65. 11-2-1926. Fishbone in cricoid narrowing.

History: Eating fish night before and on account of having false teeth did not notice fishbone in mouth. Swallowed bone and immediately choked. Called family doctor about eleven o'clock at night, who admitted her to hospital the next day.

Examination: Patient invalid and bedfast for two years. High blood pressure. Myocarditis, unable to lie on left side at all. X-ray report: There is an abnormal shadow in the midline at the level of the fourth and fifth cervical vertebrae which probably represents the fishbone faintly outlined. Dr. W. O. Weiskotten.

Under local anesthesia removed rib of fish 13% tones long from hypo-pharynx, just above cricoid narrowing, high end pointing to right wall and stuck into wall. Opposite end to left end lower. Bone broken one-fourth inch from the end. Instruments used, pharyngo-scope and alligator forceps. Sitting position

Duration of bone in situ—nineteen hours. Time of removal—one

minute.

Remained in hospital for three says, running slight temperature, sore throat, difficulty in swallowing ome edema. At end of the third day much improved and sent home.

Plate 1, No. 9.

No. 6-M. E. G., 40. 86 1924. Chicken bone in pharynx.

History: Eating chicken about 6:30 when had this piece of chicken in mouth; little gril did some amusing thing and I laughed real loud when the bone got into throat. Lots of pain in under left ear and on side of neck.

Examination: Indirect—large piece of bone in antero-posterior position with both ends embedded in tissue. Few eroded red areas on left anterior pillar and soft palate and posterior wall of pharynx.

Admitted to Mercy Hospital at 8:00 p. m., one and a half hours after the accident. Applied twenty per cent cocaine and adrenalin, equal parts, to mucous membrane of throat, placed patient in horizontal position, removed bone with alligator forceps through Jackson's Adult Laryngoscope. Very slight bleeding afterwards. Length of bone, one and one-half inches.

Duration of bone in situ—About two hours. No X-ray taken.

August 7, 1924, patient states throat was swollen this morning and there was a large swelling on side of neck. At 11:00 a. m. no swelling on neck, but there is redness and edema of epiglottis and left side of pharynx. Slight swelling left arytenoid, but not enough to interfere with action.

August 8, 1924—Improved and discharged.

Plate 1, No. 11.

No. 7—H. W., 37. 2-3-1927. Bent pin in right bronchus.

History: Coughing spells about 1914, thirteen years ago. Would take off belt and put around chest or lay hands on chest, which would give relief. For the last ten or twelve years slept on face with hands across chest. After went with destroyers, one month ago, surroundings were damp and started coughing again. Coughing right along, but not spasmodically, until one month ago, sometimes one or two spells a day, lasting from fifteen to twenty minutes and seemed like would strangle. Coughed hard, raised phlegm, and get relief. Night sweats.

X-ray taken showed foreign body, bent pin, in right bronchus.

Sent to U. S. Naval Hospital. Gave 1/4 grain morphine sulphate, 1/150 grain scopolamine one hour before painting throat with cocaine.

Findings: No ulcerated areas but two or three nodulated fibrous masses where pin has caused constant irritation.

Operation, 2-7-1927: Removed rusty bent pin from right secondary bronchus. Pin so rusty it broke at tend when being pulled into bronchoscope. Grasped point with look Tucker tack grasping forceps.

Time of removal—two minutes Duration of pin in situ—fifteen

years.

Lungs clear next day.

2-10-1927—Last night and pain in chest and up until nine o'clock this morning, when disappeared. Thought perhaps it was because was sleeping in steam-heated room and was close.

History: While playing on floor three days ago swallowed penny and Way taken by Doctor Apple of El Centro showed foreign body in thoat. Child unable to swallow foods but could swallow liquids and water.

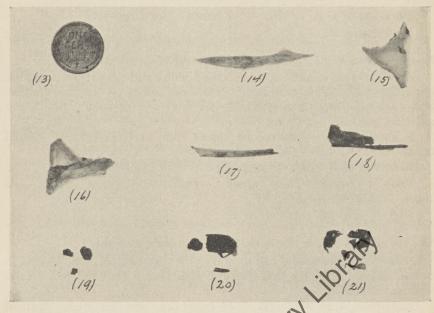
X-ray: There is metallic foreign body in the neck opposite the level of the 7th cervical vertebrae. Dr. L. C. Kinney.

Examination: Pharynx and esophagus edematous and red. Coin bathed in heavy tenacious mucus and sunken in edematous tissue. Removed penny from esophagus, no anesthesia, with six millimeter esophagoscope and long grasping forceps.

Duration of penny in situ—three days. Time of removal—one

minute.

Good recovery. Plate 2, No. 13.



No. 9—R. N., 35. 10-29-1927. Bone in Warynx.

History: While eating spareribs and faut at 12:30 noon today got a piece of bone in throat. When symbol bone had terrific choking spell and though was going to de. After awhile felt better and able to breathe easily, but sharp pains continued in throat.

Admitted to County Hospiel. No X-ray taken.

Examination: Foreign body in right pyriform fossae, upper end sticking in right side, the lateral wall of pharynx. Could not see lower end.

Under local anesthesia, removed bone from crico pharyngeal area with pharyngoscope and alligator forceps.

Time of removal—two minutes. Duration of bone in situ—one and a half hours. Length of bone—13/4 inches.

Next day slight soreness in throat. Good recovery.

Plate 2, No. 14. aigitized by

No. 10—Mrs. C. C. B., 58. 6-21-1925. Chicken bone in esophagus.

History: About twelve o'clock noon was eating stewed chicken when choked on a bone. Had full set of false teeth in mouth. No choking at time, no cyanosis. Just felt as though swallowed a bone. No X-ray taken

Examination: Nothing in mouth or larvnx. Cocainization of pharvnx, pharvngoscope showed nothing, but with esophagoscope found triangular piece of bone in esophagus at aortic narrowing. Size of bone one inch by seven-eighths inch by seven-eighths inch.

Removed with esophagoscope and long grasping forceps in ten min-

lites

Duration of bone in situ—four hours. Good recovery. Plate 2. No. 15.

No. 11—Baby C., 2½. 11-26-1922. Coin in esophagus.

History: Two months ago swallowed penny and passed from rectum, found in stool. This morning at 8:30 swallowed penny and choked. Has been vomiting off and on all day and very drowsy. No X-ray

Examination with fluroscope shows coin in esophagus at sternal notch.

Removed coin with pharyngoscope and alligator forceps.

Time of removal—three minutes. Duration of penny in situ—ten hours. Good recovery.

Plate 2, No. 13.

No. 12-W. S. B., 64. 7-18-1925. Fishbone in pharyn

History: While eating fish at noon (the day before) bone lodged in throat; started to cough and choke at that time wad full set of false teeth in mouth.

Examination, at Midnight, 7-18-1925: Temperature 99.6. Marked dyspnea and unable to swallow. Sharp pains in throat. Fishbone buried in posterior wall of pharynx, or end passing through cricoid narrowing, the other end in wall of pharynx, pressing against edematous larynx. No X-ray taken.

Removal with pharyngoscope and alligator forceps under local anesthesia.

Time of removal—about two minutes. Duration of bone in situ— 36 hours. Length of bone one and a half inches.

Remained in Paracese Valley Hospital twenty-four hours. Sent home much improved

Plate 2, No. N

No. 13-Mrs. Benj. H., 33. 8-1-1926. Chicken bone in cricoid nar-

While eating chicken in a dark corner of a cafe got chicken History While eating chicken in a dark corner of a cafe got chicken a cafe got chicken in the corner of a cafe got chicken in the capacity of the corner of a cafe got chicken in the capacity of bone in mroat about 9:30 P. M. Immediately came to office, complaining Wain on swallowing. Patient very nervous. Digitized by

Examination: With laryngeal mirror was unable to find any evi-

dence of foreign body. Sent to Mercy Hospital.

X-ray taken showed no evidence of foreign body. This reading was given by expert roentgenologist, Dr. L. C. Kinney, next morning after removal of foreign body and he knew we had removed same. Under cocaine anesthesia removed rib of chicken with large piece of meat attached from cricoid narrowing. Length of bone—1 and an eighth inch.

Time of removal—five minutes. Duration of bone in situ—three

Next day, slight pain in throat. Good recovery. Plate 2, No. 18.

No. 14—Baby D., 18 Months, 1922. Screen in cricoid narrowing.

History: Child was playing on floor and mother thinks piece of screen was brought in by another child from the street. Noticed child choking and tried to remove foreign body with finger but unsuccessful.

Admitted to County Hospital next morning. X-ray showed screen in cricoid narrowing. With no anesthesia removed with pharyngoscope and alligator forceps.

Time of removal—one minute. Duration of screen in situ—sixteen hours. Size of screen—three-quarter by one-half inch, ragged edges. Good recovery.

Plate 3, No. 22.

No. 15—Mable P., 15 Months. 8-7-1927. Watermelon seed in right bronchus.

History: Swallowed foreign body two days ago; sing then has had much difficulty in breathing. Parents think foreign bedy is watermelon seed. Patient has been treated by family doctor. Sent child to County

Hospital.

Physical Examination: Temperature, 99.2 Pulse 129. Respiration 36. No cyanosis. Throat full of mucus, or injected, no membrane. Forceful respiration, using all respiratory buscles. Resonant throughout. Numerous bronchial rales over coons of larger bronchi. X-ray shows both lung fields of equal aeration and there is no difference in the diaphragmatic excursions.

10:15 A. M.—Removal of watermelon seed from right bronchus; no anesthesia.

Time of operation—fifteen minutes. Duration of seed in situ—two

12:00 M.—Temperature 102, rectum. Pulse 136. Respiration 38. Breathing labored.

2:00 P. M.—Temperature 104. Pulse 140. Respiration 46.

2:50 P. Mc-Tracheotomy. 4:00 P. Pulse 180. Respiration 60. Removed child to operation room cleaned tube, sucked out mucus from trachea.

5 P. M.—Temperature 104. Pulse 150. Respiration 46. aiditiled by

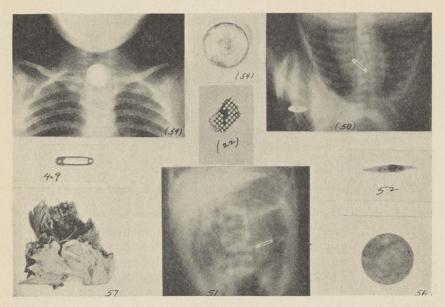


PLATE 3

6:00 P. M.—Tube came out, reason unknown. Had nurse in constant attention. Always have tube firmly held in place by cord around neck with just enough clearance to slip finger under cord. Nurse turned around for a minute, heard child cough and tube was out. Child may have pulled tube out or it is possible that there was enough forceful expiration to have expelled tube.

6:50 P. M.—Child pronounced dead. Autopsy stoyed subglottic

edema. Mucus in large amount in right bronchus and trachea.

Comment: This is a case which readily shows the reaction to vegetable material in the trachea or bronchi, and the poor resistance of a child to such foreign bodies, as has been demonstrated repeatedly by Dr. Chevalier Jackson. It is my practica to have a trained nurse in constant attendance with a tracheotopiced child. However, this was a pupil nurse and did not understand the care of a tracheotomy case. It is always practical to have the child's hands tied to its sides or splints at the elbows to prevent stabbing tube, which was not done in this case.

Plate 4, No. 2.

No. 16—J. A., 5. 3-64925. Tack in left bronchus.

Temperature wast few weeks has been varied from 99.2 to 105. At time of operation child had marked pallor and red spots on cheeks and chin. Severe cough with purulent foul smelling expectoration. Septic fewer Sweating profuse. Loss of weight and strength. Marked anemia. Catient has had frequent colds and sore throat. Tonsillectomy three tooths ago with no apparent ill effects. About six weeks ago had a attack of illness, diagnosed influenza, with fever, cough, pain in Digitized by

left chest, dyspnoea. Apparently good recovery and was up and around for two weeks when the present symptoms developed. High fever of the septic type, profuse sweats, severe cough, with foul-smelling expectoration, gradually developing anemia, loss of weight and strength. These symptoms have been present for the past months and were manifested upon admission to the County Hospital one day ago, 3-24-1925.

Blood Examination: Red corpuscles, 2640,000. White, 8,000. Haemoglobin 50. Neutrophiles 58. Dr. Finley.

Chest examination by Dr. S. J. McClendon: Expansion increased on right (compensatory). Limited on left over entire chest. Tympanitic resonance over left upper lobe from apex to fourth interspace anteriorly. Amphoric breathing same area. Dullness from left fourth interspace to base. Crepitant rales left base. Increased whispered and spoken voice sounds same area.

X-ray Report: There is a foreign body, apparently a tack, in the left bronchus on a level with the sixth rib with head directed downward and to the left. The left lung is solid with small multiple abscesses throughout. A. E. Elliott.

Bronchoscopy Examination: No anesthesia. Profuse flow of pus in trachea and when passed bronchoscope into left bronchus unable to control outburst of pus which filled both lungs or bronchi and came up around scope into mouth running out over lips and out of nose.

Termination of death by drowning in own pus. After death removed tack from granulated area in left bronchus.

Duration of tack in situ—probably six weeks. Specimen lost.

Plate 4, No. 3. Tack in left bronchus, shows tack prominently.

Later X-ray showed pathology of lung and foreign body.

Comment: This child was a very poor surgical risk, and knowing there were multiple abscesses in the lungs I thought it better to attempt

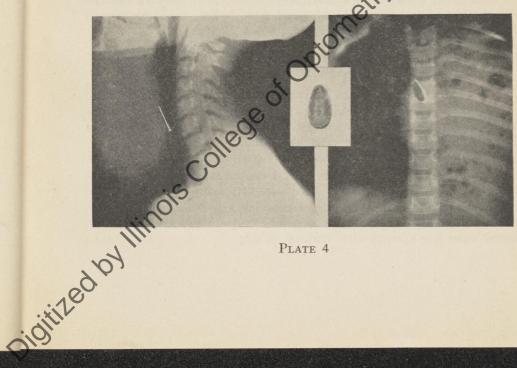


PLATE 4

to remove the foreign body than to have a rib resection and removal of pus through the chest wall. However, I feel that had this child had a rib resection and drained this apparently large abscess before operation for removal of tack, the child would have had a better chance for recovery. The pus flowed so rapidly could not suck it out with aspirator and keep tube clear.

No. 17—M. M., 7. Metal slug in pharynx.

History: Out playing with children. Had large slug in mouth and accidently swallowed it, lodging in throat. Severe pain on swallowing and unable to turn head to right or left. Chin up and shrugged shoulders when swallowed.

Operation: Removed slug from throat with pharyngoscope and alligator forceps; no anesthesia.

Time of removal—one and a half minutes. Duration of slug in situ—three hours. Diameter of slug—one and a half inches.

X-ray by Dr. McCausland showed metallic body in pharynx. Plate 3, No. 56.

No. 18—Mrs. M. A., 76. Bone in esophagus.

History: For three days has had sliver of bone of pork steak in throat. Choking feeling in hollow of neck and unable to eat solid food since. All can do is swallow liquids. Complete set of false teeth and had them in mouth when eating.

No X-ray taken.

When holding larynx firm in hand and moving from side to side felt sticking sensation in each side. This is a sign that Dr. Tucker has mentioned many times in his papers, practically proving foreign bodies in situ in place of having a scratch which the patient feels and thinks is foreign body.

Operation: Under cocaine anesthesia removed bone one inch by onequarter inch, sharp pointed at each end from below cricoid narrowing. Instruments used, pharyngoscope and alligator forceps.

Time of removal—one minute Ouration of bone in situ—three days. Plate 3, No. 52.

No. 19—W. P., 3. 3-22-1328. Metal slug in esophagus.

History: About two o'clock the day before swallowed telephone slug. Swallowed little milk and cocoa last night for supper. Unable to eat solid food. That some milk this morning for breakfast.

X-ray shower round metal body in cricoid narrowing of esophagus. Examination: Well nourished boy. Head extended, chin up, apparently in goat deal of pain. Eyes bulging; very nervous.

Operation: Removed metal slug from cricoid narrowing of esophagus with tackson pharyngoscope and alligator forceps; no anesthesia. Swal-Digitized by lowed water five minutes after removal of slug.

Time of removal—one and a half minutes. Duration in situ—24 hours.

Plate 3, No. 54.

No. 20—Mr. S., 86. 3-17-1928. Large piece of meat in larynx.

History: Deaf, blind. Has been ill for good many months. Has been on restricted diet. Aged lady caring for patient gave him tray with large chunks of roast beef, then left room. Soon heard him gagging and a man in the house removed large piece of meat from his mouth, thinking that was all. Called a doctor, who upon arrival found patient very cyanotic; heart still beating, but in three minutes patient was dead.

Post Mortem Examination: Removed large piece of meat from larynx, where it completely capped the larynx, blocking the airway. Meat measured two and one-quarter inches by one and three-quarter inches by one inch. Laryngoscopic. Bronchoscopic and esophagoscopic examination after removal of chunk of meat revealed no pathology. This was all done post mortem one hour after death.

Comment: Had this man had a tracheotomy immediately upon arrival of the doctor who was called in attendance, his life would have been saved. However, the doctor was prepared to do none of these things, and a large piece of meat having been removed, felt there was no more in the mouth or throat that could be removed, and possibly a piece had been lodged in the larynx or trachea. However, with a man eighty-six years of age, blind and deaf, in my opinion this was a very happy termination for him.

Plate 3, No. 57.

No. 21—C. B., 4 Months. 3-24-1928.

History: At 10:00 A. M. brought in to office by emergency police ambulance with history of having swallowed safety pin. Sent to County Hospital, where antero-posterior way was taken, at 11:00 A. M., showed a closed safety pin in the cit bronchus. At 2:00 P. M. the same day, without further X-ray diuoroscopy examined bronchi for pin. Unable to find it . Anoth X-ray revealed pin in abdomen. Child had some difficulty with subglittic edema yet at no time cyanosis. Ran slight temperature. Discharged from hospital in four days.

Pin was recovered by sifting the stools at 5:30 the next morning.

Plate 3, Nos. 49-50-50

11-7-26. Fish bone in throat.

History: Fish bone in throat for one hour. Pain on swallowing and

Examination: Fish bone crosswise anterior to the epiglottis and just below the tip. No anesthesia. Removed with laryngoscope and alli-DiditiZed by gator forceps.

Time of removal—20 seconds. Duration of bone in situ—one hour. Length of bone—one and one-half inches.

Plate 1, No. 8.

In the following cases I am presenting some that have been sent to me for removal of foreign bodies, or questioned foreign bodies, on account of difficult breathing or pain or history, and which I did not remove, when foreign bodies were found, per oral endoscopically.

No. 1—Mrs. C., 23. 5-8-1925. Fish bone in left tonsil.

History: Had fish for breakfast and few hours after eating felt a soreness in the throat just below angle of jaw.

Examination: Bone in lower pole of left tonsil, extending upward. Butyn anesthesia, painted area with mercurochrome. Removed bone with bayonet forceps.

Time in situ—about eight hours. Length of bone—one-half inch.

Plate 1, No. 3.

No. 2—Frank D., 33. 12-26-24. Fish bone in tonsil.

History: Eating fish for dinner and felt tickling in throat. Butyn anesthesia, painted surface with mercurochrome. Removed bone from posterior surface of lower pole after working for one hour in trying to locate. Removed with bayonet forceps in just a few seconds when found.

Duration of bone in situ—two hours. Length of bone—threeeighths inch.

Plate 1, No. 4.

No. 3—HAROLD C., 19. Pin in pharynx.

History: About three o'clock was holding straight pin between front teeth and laughed and pin went down into thoat. X-ray shows pin lodged between posterior wall of pharynx and posterior wall of aryte-noid, head down, and point sticking in notion part of apex of aryte-noid. Had patient with feet higher that head, ready to remove foreign body, and he felt something loose in his throat and spit the pin out.

Duration of pin in situ—two doors.

Plate 1, No. 5. Plate 4, No. 1.

No. 4—Mrs. B. T. V. 22. 7-29-1925. Fish bone in right tonsil.

History: Was eating fish at noon and bone lodged in throat. Feels

like sticking in both sides of throat.

Examination One hour later—fish bone sticking in middle of right Digitized by Wate 1, No. 10. tonsil, projecting across to opposite side. Removed with bayonet forcep fish bone one inch in length, about one-quarter inch buried in tonsil

Duration of bone in situ—one hour.

No. 5—Lottie C., 18. 4-28-1924. Chicken bone in pharynx.

History: Eating chicken tonight and piece lodged in throat, two hours ago.

Examination: Nothing in larynx or pharynx.

Upon application of butyn to anesthetize throat patient vomited up large triangular piece of bone. No X-ray taken.

Duration of bone in situ—two hours. Size of bone—one inch by one inch by three-quarter inch.

Plate 2, No. 16.

No. 6—Mrs. B. 8-30-1927. Gold crown of tooth in abdomen.

While eating dinner temporary crown scratched throat. Telephoned her dentist, who in turn telephoned me. I advised the eating of mashed potatoes that night and X-ray next morning to find location of crown. X-ray report, Dr. Elliott. A plain film of the abdomen shows the shadow of an oblong metallic body measuring 1.5 cm. by 1 cm lying in the midline on a level with second sacral body. It is presumably in the intestinal tract. This was sixteen hours later.

Removed crown from stool within forty-eight hours.

No. 7—Ella T., 25. 11-24-1926.

History: Patient admitted to County Hospital history of having eaten watermelon two or three days before and since that time has feeling of watermelon seed in windpipe. When breathes in can feel the seed go down, and when coughs or breathes out can feel seed go up.

Bronchoscopy reveals no foreign body but paralysis of left arytenoid. Left arytenoid drawn in toward median line or inspiration and pressed out on expiration. Right arytenoid and cort freely movable with a complete expansion on deep inspiration. This same thing is visible with the indirect examination. Hypopharynx is negative, examination by direct pharyngoscope.

Diagnosis: Paralysis of left arytenoid. This in my opinion is due to a tubercular condition or to lues.)

X-ray Report: Chest is so clearly deformed by right lordosis that all ordinary landmarks are invalidated. There is some apparently old peribronchial thickening in both upper lobes, but no definite evidence of active process.

Wasserman: Negative

(I mention this case show what we have to deal with in the limitation of foreign bods when there is none or has not been.)

No. 8—Hugh McD., 65. Nov. 15, 1927.

History: Trable to swallow; difficulty in breathing. Ate fish night before for dinner; very soon after began to have difficulty in swallowing. This gradually progressed and early in the morning marked dyspnoea developed. Admitted to County Hospital at 9:00 A. M., as foreign

body in throat. X-ray revealed no foreign body but barium unable to pass into esophagus.

Indirect Examination: Marked edema of epiglottis, arytenoids and all the walls of pharynx. Attempted laryngoscopic examination. Patient unable to breath. Did tracheotomy. Then proceeded with laryngoscopic and esophagoscopic examinations. No foreign body found.

Final Diagnosis: Edema of glottis, probably due to protein sensitization.

Examination, second day, edema practically gone; pharynx and epiglottis very red. Fifth day, pharynx and larynx practically normal.

Removed trachea tube on seventh day. Good recovery.

There is a great deal of pleasure in relieving a person, and especially a child, from distress and approaching death, due to a foreign body in the airway or food passage. Most of the time this is done in the County Hospital or among a class of people that are financially unable to pay anything for services rendered. On the other hand, we have those that are able to pay and some to pay well for such services.

On what are we to base our fees? It is certainly worth as much to the patient to have a foreign body removed from the bronchus or esophagus as it is to have his appendix removed, and it is on this basis that I try to fix my charges. However, often times my fee is not paid, and if so, with a great deal of hesitation, and with the impression that I am robbing them.

Doctor Cunningham, of Vancouver, very aptly stated in his paper read before this Society in San Francisco two years ago, that the longer the time required and the nearer to death the patient came—and these are generally from lack of skill—the greater the subjunt and the more readily the patients, or their parents, are inclined to pay for services. I have even had them give me checks at the time of the operation and within a short time find the payment on check had been stopped, thinking they had been robbed, and manted to settle a one hundred and fifty dollar account for ten or fitteen dollars.

In discussing this paper—if the is a discussion—I would appreciate very much a sincere and think discussion pertaining to the financial settlement.

Dr. Simon Jesberg, Los Digeles:

Mr. Chairman and thembers: I think in this symposium on Bronchoscopy, both paper, buld be well discussed at one time. I want to congratulate Dr. Brown on his large number of interesting cases. There is nothing so the believe me as some of these foreign body cases, and we feel most helpiess in the management of the outcome of some of these patients. Dam speaking out of considerable experience that the job of the endoscopist is not an enviable one. However, it has its compensations other than the financial. I don't believe we ever feel any more like heroes than when we think we have saved a life by the removal

of a foreign body. That is enough compensation, and the rest takes care of itself.

I want to congratulate the first speaker, particularly on his presentation of education in this work before you take it up. You know this work has all been laid out so nicely by Dr. Jackson and others that any one undertaking it, unless it is just in the direct emergency requiring the immediate removal of a foreign body, has no excuse for undertaking it if he can send it to someone. There is no use in going after it in an original manner. Nearly every problem has been well studied and well laid out as to what course to follow, so you do not need to be original.

I was interested in that false tooth method. I had never thought of that. That is quite a factor with elderly people in swallowing for-

eign bodies.

There is need for education among the general profession, particularly pediatricians and roentgenologists, to let them know that there is such a thing as air trapping. Many cases have been supposedly well examined by the pediatrician or the roentgenologist, and only after suppuration has occurred, as Dr. Brown has shown, are they willing to admit that perhaps a foreign body was there. The only reason they didn't recognize it before is that they did not know the well described, not new now, diagnosis of non-opaque bodies in the respiratory tract. There is no excuse for it. We have to educate them, however.

Diagnosis of non-opaque bodies in the esophagus has recently been aided by Ed Flowers(?) method of swallowing lipiodol, and I believe

it holds great possibilities.

The upper esophagus holds a field that is in its infancy as far as we are concerned. How many patients come to us with some trouble in swallowing and we usually put it down as globally ystericus. That is a field as yet unexplored, as to what happens. I believe great possibilities are present. I might suggest such a thing as a bag containing an opaque substance, which has been tried that never been completed, and fluoroscopic and roentgenological studies of the actual act of swallowing. You can't tell about the act of swallowing with pharyngoscope and fluoroscope in place. That must be done without that interference.

The matter of the tack that the Brown spoke of just brought to my mind one thing of a similar experience. I believe if Dr. Brown had had a suction machine that was powerful enough he could have saved that patient from drowning. I say that advisedly, not criticising Dr. Brown's technique, but the suction machines put out commercially to handle the work are absolutely inadequate. They pump up to twenty-seven inches of pressure if you hold them, but the volume is so small that if you have to aspirate quickly an esophagus in a case of dilatation of an esophagus that held anywhere up to three or four pints, you have to have some Ding that will pull it quickly. No slow action can be tolerated and in a case of that sort it means that our equipment that we use host fit our particular needs, and that we cannot do this work in any haphazard manner in any hospital. You have to have your

particular place where you work so you can meet all emergencies. (Applause.)

Dr. H. B. Graham, San Francisco:

There are curiosities in all of these things, and one of them happened to me. I think that I spoke of this once before. If not, it will be interesting to you all. A nurse came to me with a foreign body in the esophagus. As I remember it was a fish bone or some kind of a bone which had made an abrasion in the esophageal wall. There was air in the neck and a great deal of temperature. She had had the foreign body nearly a week before she came to me and she complained quite a good deal. I attempted to get the foreign body out; found the bone, as I remember it, and she came back the next day and said that she didn't feel exactly right. I took an X-ray and found that a piece of her tooth (she had an inlay), a piece of inlay had been dislodged and was lodged in her neck outside of the esophageal wall. During the process I had knocked off this piece and pushed it through the esophageal wall. I then went after this with the esophagoscope and during the process of my work the nurse leaned up against some of my instruments, because when I put my instrument down and grasped the foreign body, I broke off the end and found foreign body number three in the esophagus. I got another pair of instruments and got number three out, but I couldn't dislodge the piece of tooth. Later, from the outside, I managed to dislodge it so it went on to the stomach. We didn't get that. That week she told me she wanted her mother to come over to me because her mother had gotten a prune stone down in the esophagus and wanted to get it out. However, before she came over she coughed it up. That made four in one week.

Dr. A. N. Codd, Spokane:

The case Dr. Brown showed of metallic body in bronchus for thirteen years demonstrates the capacity the lung has for metallic bodies in contrast to vegetable bodies. He showed one case of watermelon seed. It is common to get a very interest reaction following a vegetable foreign body.

Dr. Frank E. Chase, Seattle:

I don't know that I should talk on this subject, although I have had an outfit for some twenty ears. I have delegated my work to an associate, and mentioning the matter of fees, I thought that might possibly include me. One reason I quit was because of the fees. I have had such a few case that if I had depended on the fees I couldn't be down here today.

The men who have talked today have talked on Bronchoscopy and Esophagoscopy; have talked almost entirely about foreign bodies. I am not finding fault with that, far from it. It is fine, and we should know about those things, but we should segregate Esophagoscopy and Entoscopy, because they are separate things.

Dr. Brown especially mentioned an elderly patient with a large piece of meat in the esophagus, and in these the question enters of whether you do not have malignancy.

Another thing I would mention is a case of lung abscess in which the individual showed a calcareous gland which had ruptured in through the bronchus.

Another interesting case which has come to my attention is one of a nurse trying to get into a tubercular hospital. As a rule, tubercular cases should not have Bronchoscopy, but they were able to obtain the tubercular bacilli by Bronchoscopy, while otherwise they could not.

Another thing—this specialty is very closely related to the tubercular specialists and I might state that several cases have been picked out that I know of in which an abscess has been shown which showed by being aspirated which did not show before.

I think this—that we nose and throat men must educate ourselves to know what we want and then educate the general practitioner.

Dr. John A. Fuller, Reno, Nevada:

I saw a case some years ago, a rather tragic thing. A child had a history of having inhaled a bean, and they had X-rayed it and one thing and another and were trying to locate it. The doctor left the place, and in the afternoon I got a hurry up call that the child was choking to death. He was dead before I got there. The thing had dislodged and had probably worked up to the glottis and he had choked. I was so shocked I didn't even stay in the house.

It shows the necessity of keeping these cases under observation all the time as they do dislodge sometimes.

Dr. Harold A. Fletcher, San Francisco:

I feel that the general men are sometimes backwards in calling the endoscopist out to examine a case, but sometimes they call us out and we have to be a little careful. I was called out by a very good general internist and a general surgeon to remove a foreign body in the lungs, and in examining the case I found very definitely a marked edema of both right arytenoids and hypo plands, and a definite acute infection of these parts probably of streptococcic nature, and I had a devil of a fight to keep those fellows from making me push my instrument down and killing the woman. I claved it off, but I was put in rather an embarrassing position for a half or three-quarters of an hour in arguing that she didn't have a threign body, except a slight history of choking a few days before and difficulty of swallowing, which had been increased with the development of her acute infection.

The woman accovered, but for a little time I was accused of being afraid to go down, and those are cases we sometimes have to think about—being urged to make endoscopic examination where it is absolutely not indicated.

President Mellinger: If there is no further discussion, Dr. Brown, will you close?

Dr. Brown: Regarding the matter of compensation, Dr. Jesberg says when you have sayed a life it is fully compensated—that is nice when you have money. When you have a man worth two or three million dollars and you take a fish bone out of the esophagus and send him a bill for \$400.00 and he comes up and raises particular hsaving there was no operation, no cutting and why should you charge anything like that, what are you going to do when he offers \$10.00? You feel like telling him where to go, and it is to me rather an embarrassing proposition when you have a person with a lot of money trying to tell you that there is no operation and why should any money change hands, especially of any value, more than five or ten dollars for an examination. I have charged as high as one hundred and fifty dollars in several cases for removal of a foreign body. I have charged as high as two hundred and fifty and got it. Twice I have had them give me checks and by the time I got to the bank and the check got through the clearing house and to their bank it had been stopped. I have two cases like that in which I am suing the people. They have money and yet they feel not justified in paying that price for the saving of their life. To me with a person who has a condition like most of these foreign body cases it is a life-saving process, and if they have no money there is nobody any more free to give their time than I, but at the same time I would like to have a little money to keep up my office and to keep up appearances and attend meetings.

About work other than foreign bodies—last week I had four cases at the County Hospital. I work there every Thursday, and we find that in bronchiectasis and tracheitis and those type of cases, fibrous exudate in the bronchi, the patients get a lot of relief if they have Bronchoscopy every two or three weeks, and have one man that wants it every week.

Regarding a suction pump, in that case it was absolutely impossible to control the pus at all.

Regarding the man with the chark of meat, the doctor made the mistake of not thinking that the should be a further examination. There was laryngoscopic, bronchoscopic and esophagoscopic examinations with absolutely no sign of malignant pathology.

Regarding the importance of keeping cases under observation, in one case X-ray taken at eleven o'clock, again at two o'clock and at three took another way and found the foreign body in the stomach.

Regarding examination for conditions of the larynx where the family doctor calls you but, I have had it repeatedly happen where some of them do not realize that they have a T. B. case to deal with, and you are called in a case of tubercular laryngitis and they want you to examine for foreign body.

There was one case where the doctor worked for an hour with his fine in throat to get a foreign body; then sent her down to emergency

hospital and they sent her to the County Hospital and all we could find was a nice big scratch on the epiglottis. Treated the patient and asked her to return the next day and again the next, and the patient was well, and she had no trouble with foreign body.

Dr. Simon Jesberg, Los Angeles:

If I ever had a patient with two million dollars and I could take a foreign body out, I wouldn't worry about the fee.

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OTITIS MEDIA, ITS COMPLICATIONS AND TREATMENT

J. Thomas Dowling, M.D., Seattle, Washington

In writing on the subject of otitis media I realize I am writing about a disease that is very old, indeed, in point of recorded history, and I cannot hope to add to the literature but only wish to emphasize some points in this paper which may be of value to my hearers.

French and English scientists study the pathology of Egyptian mummies find evidence of what must have been ear disease, such as chronic otitis media with bone destruction, in and about the middle ear and mastoid. Hippocrates mentions that certain Greeks suffered with "great pain of the head and ears." No doubt the ancient Greeks suffered with earache and therefore with otitis media. One may trace evidence of ear disease from the ancients down to the present time. Probably the greatest impetus to the study and differentiation of otitis media as an entity was given by the group of Austrian and German otologists which includes Barony, Alexander, Hajek, Politzer and others of equal scientific skill and ability.

A knowledge of the embryologic development of the ear with special reference to the middle ear is needed in understanding the pathways of infection and the points of weakness in this region.

EMBRYOLOGY OF THE EAR WITH LANTERN SLIDES

The ear of mammals and of man consists of the actual sense organs, the inner ear (labyrinth and cochlea), and the sound conducting apparatus, the middle and outer ear. In addition to conduction in hearing, which belongs only to the cochlea, the inner ear also serves for the perception of the condition of equilibrium. The epithelial lining of the inner ear comes from the ectoderm, that if the middle ear from the entoderm and that of the outer ear, again from the ectoderm.

The anlage of the auditory organ like that of the olfactory organ and the crystalline lens, first appears as a plate of thickened ectoderm. This development first occur the embryo of about nine pairs of mesodermic somites.

In the embryo of about four weeks the auditory vesicle begins to show differentiation of the semicircular canals from the ventral portion of the cochlea. The apprior canal is the first to form, the posterior the second and the extend the last. The development of the middle ear in man has been made clear by the thorough investigations of Hammer. First, the period of the primary tympanic cavity begins in the first month and the seventh week; second, the period of the tubotympanic canal ends in the third month; and third, the transformation period in which the tubo-tympanic canal is transformed into the definite tympanic cavity of the tubo-auditiva; this last period is not

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completed at birth, but is continued into post-fetal life. The manubrium mallei belong genetically to the first branchial arch.

The tubo-tympanic canal is formed from the primary tympanic cavity by a construction which takes place in an aboral-oral direction.

The development of the auditory ossicles is a matter of considerable debate among leading embryologists. The conclusions of Reichert seem the most universally accepted, that is, that the malleus and incus are formed from the first visceral arch, and the stapes from the second.

The auditory ossicles have reached their definitive size at birth, but the tensor-tympani muscle makes its appearance at the end of the second month and the stapedius arises at the middle of the third month of fetal life.

The predominant etiological organism in acute otitis media varies somewhat according to the reports of various authorities. However, the streptococcus leads in frequency in practically all of the statistics. The staphylococcus comes next with the influenza bacillus and the pneumonococcus following in order.

The predisposing causes of otitis media may be grouped under acute infectious diseases, especially the exanthemata, and paranasal sinusitis. Dean calls attention to acute otitis media and mastoiditis directly traceable to paranasal sinusitis in children. Lierle² has reported a number of cases of acute otitis in infants which resembled "Cholera infantum," and practically all of these were relieved immediately upon proper treatment of the middle ear infection. In cases presenting such symptoms he makes a strong plea for early and frequent examinations of the ears and paranasal sinuses.

Lyman³ says that at birth the mesodermal tissue which is later absorbed, leaves various folds of mucous membrane derisistent in the tympanic cavity in later life. Resorption of this membrane begins shortly after birth. The resorption begins in the lower tympanic cavity and by the eighth week of life the lower and hiddle portions of the tympanum form a distinct cavity, with this inucous membrane folds persisting. The upper portion of the typosinum, the so-called epitympanic space, is not free from the muccos tissue until the first, or well into the second year. Satisfactory canage will take place if the infection is limited to the lower perton of the tympanum but not if the epitympanum also is invaded. &

In checking up on the last twenty cases of acute otitis media in infants, I have found, in freen, the otitis media was secondary to paranasal sinusitis. Fourteen of these children were artificially fed and poorly nourished. Wee cases were classified as primary mastoiditis, that is to say, they resented no cardinal symptoms of otitis media, but upon operation hark mastoiditis had developed. Twelve of the number had bilateral 66tis. The type of the causative organism showed a preponderance of the staphylococcus group without differentiation. Twelve per cent of the infections were caused by hemolytic streptococcus. It was found, however, that the type of organism did not always indicate aightized by

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the severity of the disease, which fact was probably due to that mysterious, variable factor known as individual resistance.

It is essential that the pediatrician and otologist work together in the treatment of these cases. Often the otologist after local examination considers an infant needs a myringotomy of one or both ears, but the pediatrician who has had the child under constant observation objects because of its good general condition. Another point, worthy of emphasis, is a careful search for paranasal sinus infection. It has been found that acute otitis media in infants is secondary to paranasal sinusitis in a large majority of cases. In the small series here reported it is seventy-five per cent. Treatment of otitis should include measures, surgical if need be, toward the correction of the nose and throat pathology and a careful myringotomy under good illumination and aseptic conditions. However, conservative measures should be tried, such as ephedrin hydrochloride, 2 per cent spray, or drops, in each nostril, followed in a few minutes with 2 to 5 per cent argyrol solution. Severe pain often demands incision of the drum membrane for relief when its appearance would suggest delay.

It is well to consider, in the diagnosis and treatment of otitis media in the young, besides past and recent history, the following signs and symptoms: earache, temperature and posture and general appearance of the patient. A leucocyte count should be made whenever possible and a myringotomy should be done whenever the tympanic membrane is red, swollen and bulging. It is a safe procedure to do a paracentesis in case of doubt. In some of the pediatric hospitals of the East, notably in Boston, this operation has become almost a routine procedure in such cases. It is well to have a roentgenogram of each mastoid region and this picture must be taken properly to be of value for a diagnostic study for if improperly taken it is often worse that paseless. A culture made from the discharge, at the time of the paracentesis, often gives a very definite knowledge of the primary infecting organism. In severe infections, with high temperatures and meningeal symptoms, a blood culture if positive is of aid.

John J. Shea⁴ calls attention to glubbe intolerance in children with suppurative sinusitis. With this in find I have noted the sugar tolerance in my recent cases of supptualive otitis and have found it invariably low. In the presence Confection, such as suppurative otitis media, or both, it is well to remove sugar from the diet altogether, or to allow sparingly such sweets as honey. In frank cases of diabetes, so proven, the diet should be carefully supervised by the internist, and insulin given under the direction.

Acute suppurative otitis media may often be complicated or masked

Acute suppurative otitis media may often be complicated or masked by broncho-pneuronia, gastro-intestinal disturbances, pyelitis and cystitis. Toda in America, there are two rather separate schools of opinion upon this subject: Briefly, one holds that acute suppurative otitis media and mastoiditis are often the cause of gastro-intestinal, lung and thary disturbances. The other that gastro-intestinal disease, pyelits and broncho-pneumonia are the exciting causes of the otitis.

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Harold I. Lillie⁵ reported a short series of cases before the American Laryngological Rhinological and Otological Society in 1922 in which the septic type of temperature was not referred to the ear and the differential diagnosis revealed pyelitis, broncho-pneumonia and gastro-intestinal disease.

Reflex pains, resembling otalgia at times, must be considered in making a diagnosis of otitis. Sluder has described a painful syndrome associated with disturbance of the sphenopalatine ganglion. Patients with recurring otalgia, who have been carelessly classified in the psychoneurotic group, often are found to have a spheno-palatine ganglion disturbance. Severe otalgia without other symptoms may be caused by

In this paper I have tried to confine my observations to acute suppurative otitis media in children. While this disease is no respecter of age, it is most common in childhood and therefor in order to protect the health and usefulness of our future citizens it is necessary that particular care should be taken in the diagnosis and in the proper management of the treatment.

SUMMARY

- Otitis media is as old as the history of the human race.
- 2. The incidence of the disease is influenced by anatomic and hereditary factors.
 - 3. The streptococcus is the most frequent exciting organism.
 - 4. Paranasal sinus infection is often the initial localization.
- 5. Acute otitis media should be considered a complication rather than a clinical entity.
- 6. Early diagnosis and treatment is of the utmost importance. Most cases are seen at first by the pediatrician and general practitioner on whom falls the duty of early diagnosis.

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Discussion opened by Dr. Penson Wood, Los Angeles:

Otitis media, especial in infants and children, is very often secondary to scarlet fever measles and diphtheria. The ear inflammations which are secondar to these diseases may be clinically divided into two main classes First, the serous or catarrhal inflammations; and second, the putalent inflammations. While as a rule this classification obtains, man times the dividing lines are indistinct, and the mild, serous forms are but the forerunners of the severer purulent inflam-

aigitized by mations. Differentiation between the two is often impossible, and when the true pathologic picture lies obscure beneath the veil of perplexing local and general symptoms, a safe rule is to treat the case as a purulent one and to make an early and free incision of the drum membrane.

The frequency and severity of ear complications in scarlet fever vary greatly in different years and in different epidemics, occurring in from one to seventy per cent of cases. These are almost invariably streptococcus infections, a direct extension, by the Eustachian tube, of the inflammation in the nasopharynx.

Complete destruction of the drum can take place in from twenty-four to forty-eight hours, and in neglected cases caries and necrosis of the ossicles frequently occur, followed in many cases by acute mastoiditis. These cases can be saved only by an early incision of the drum membrane and if this fails to check the advance of the suppurative process, an early mastoid operation must be performed.

In the cases where the operative indications are perhaps not clearly defined, we must remember that an early operation means almost invariably recovery with a dry ear and good hearing, while a neglected case or a postponed operation means a chronic discharging ear with less of or greatly diminished hearing.

Some three years ago the Ear, Nose and Throat service in the contagious wards of the Los Angeles General Hospital instituted a routine daily examination of the ears of all scarlet fever and measles cases, this examination being done by a resident especially trained for the work. They found that the internes are not properly trained in inspecting ear drums and we took a resident especially trained in the appearances of ear drums, both normal and pathological.

At the first indication of middle ear inflammation the drum is freely incised and appropriate treatment instituted. This practice has reduced the graver aural complications, such as masterditis, serus thrombosis and meningitis to the point where they are indeed a rare occurrence. I think last year we had two mastoid operations secondary to scarlet fever, which in comparison with several years before was almost unbelievable, and one of those cases was a frank middle ear abscess on admission. These cases are not discharged from the hospital until they have a dry ear. They are kep on the hospital in quarantine until they have a dry ear. That more or less warrants retained hearing.

As to observations of infants suffering from gastro-intestinal and nutritional disturbances which did not respond to ordinary methods of treatment, in 1921 matrice Renaud found pus in the mastoid antra of seventy infants doing of gastro-intestinal and nutritional disorders.

In 1923 Markott (McKim Marriott, Dept. of Pediatrics, Washington University and St. Louis Children's Hospital) began examining at autopsy, the mastoids of infants dying of severe nutritional disturbances and formed pus. Drainage during life was therefore carried out.

Sopple post auricular drainage was in many instances followed by an intraordinary change in the general condition of the infants. Deci-

sion to operate depends as much upon general medical as otologic indications. It is essential to rule out other possible causes of gastro-intestinal disturbances.

Dr. A. W. Howe, Tacoma:

I have always been interested in the subject of otitis media. I have enjoyed this paper very much. Pneumonia is one of the upper respiratory diseases in which otitis media develops without pain and this thing should always be considered and daily inspections of the ears should be made.

Measles is probably the greatest forerunner of otitis media, and in this type we get most often the streptococcus infection. I think where we are doing paracentesis work in the homes or in the hospitals, we should carry with us our sterile applicators and slides and culture tubes and always, after doing a paracentesis, take a smear and a culture. Many times we can learn from that alone the type of infection with which we are dealing.

This spring especially I have found in my own experience that where we run across the strep infections, those types most often lead to mastoid operation, whether we did an early paracentesis or not. On the other hand, where we got a staphylococcus infection, we could go along and feel a little bit more easy about the case and could be more patient about it and those cases invariably spontaneously recovered quickly. They would very suddenly cease discharging, sometimes in seven or eight days.

I am glad that the doctor discussing the paper mentioned the fact about the catarrhal types where you are in doubt it is better to do a paracentesis and treat it as the suppurative type. Kopelsky(?) has done a lot of work on otitis media and has been able binself to differentiate between the catarrhal types and the suppurative types and has been able to treat the catarrhal types without paracentesis. I believe, though, the safest method would be to do a paracentesis wherever in doubt.

The older men, like Rutin, in Vienna and Politzer, have not paid much attention to the catarrhal types of titis media.

Dr. P. C. Means, Santa Barbara

There is one thing the specker didn't mention about which I feel very strongly. I don't know whether you men feel the same, but I do believe that adenoids cause primary and recurrent otitis media, and I always try to do an opting of the drum under light anesthesia, if possible in the hospital and I have my adenoidtone handy and take out all I can get of the adenoids at the same time.

Emerson of Roston says he knows in his own mind that he has saved lots of Gastoids by following that. You get prebleeding and depression of the mucous membrane around the Eustachian tube, and it returns to formal quicker, and I thoroughly believe it is a wise thing. You would find many of these otitis medias, at least while they have

had recurrent attacks, but what you will find enormous adenoids overhanging the mouth of the Eustachian tube.

Dr. Moose, San Bernardino:

I am particularly interested in a disease as common as otitis media.

A condition like a penny in the bronchus of a poor individual why should I attend to that when there are people nearby like Jesberg who are skilled to take care of it?

The point I want to bring out right now has to do with a phase of diagnosis. I haven't seen a great deal about this in the literature and I haven't heard much about it in general discussions—this point I am going to mention now. In these acute otitis media cases in the canals near the drum there are what I call blisters. They interfere with a good view of the drum and consequently interfere with the diagnosis. Sometimes I believe the drum is opened when it should not be because these blisters or vesicles were the cause that gave the appearance of bulge in the drum.

I have found that they fluctuate and they can be punctured painlessly with no local anesthetic with the sharp point of a small applicator. When they are cleared out of the way a good view of the drum may be seen. I have recently had a case of that nature.

Taking myself as an example of a case, I have recently had acute catarrhal otitis media, which came on inside of eight hours, and during the night the canal of my ear was filled with fluid. There was no other discharge that developed later on in the ear. I am convinced that one of these blisters broke and since I have had no other pain and nothing else was done to my ear, it gradually subsided and the hearing came back in about two weeks.

If the essayist will, I would like for him to say a word regarding condition. this condition.

Dr. Joseph D. Lewis, Santa Barbara:

This is a subject of great interest and quite recently some valuable information has been gained and added to this subject with particular reference to children. It is interesting to know or to remember, rather, that the size of the adult tympanim and that of the infant do not differ greatly in size. Of coarse, the Eustachian in the infant is shorter, of larger calibre and ilmost horizontal and that may explain, from a mechanical viewpoint, the frequency of infections of the middle

rose that as a result of the methods of material is frequently carried from the nose cholera infantum is to be found in the middle ear and the paranasal sinuses.

The work of Jeans(?), supplemented by that of Marriott and has been very interesting and very helpful to us. For

instance, P found in a series of thirty-three post mortems in children who had died of the so-called "cholera infantum," twenty-eight of them had septic infections of one or both middle ears.

With reference to the streptococcus, more and more I am coming to believe that the streptococcus, which as we see is a great traveler, is the primary infecting organism in many of the cases in which subsequently we are unable to prove anything more than a mixed infection.

The tympanic membrane is not always red, swollen and bulging when the middle ear is infected. You find pus in many of those cases following a free myringodectomy where the tympanic membrane is only gray. Of course, that is not common, but that is an observation which has been confirmed by many.

Dr. Howe referred to the work of Kopetsky(?). I think that his differential between coalescent and hemorrhagic types of mastoiditis has added a great deal to our diagnostic understanding of those two cases and it is in the differential between those types that the roent-genogram is a most valuable diagnostic aid in mastoiditis. In the coalescent type, with roentgenograms taken daily you will see a melting a destruction of the intercellular spaces of the mastoid cell and eventuating in an abscess, while in the hemorrhagic type there is no change in the intercellular spaces throughout the entire course of the disease, but the clinical symptoms are quite different.

The hemorrhagic type is what we formerly referred to as the fulminating variety with rapid rise and fall in temperature, great prostration, and in other words, manifestations of a streptococcemia, a proven streptococcemia, while in the other types the symptoms are milder. That, I think, will prove very helpful in the differential of the two types as well as indicating the proper time for surgical intervention.

Dr. Frank E. Brown, Salem, Oregon:

I am quite interested in what has been said about prophylaxis of mastoiditis. I think shortly we will be talking of the prophylaxis of otitis media. Dr. Wood suggests that he was only had two mastoid cases following scarlet fever, and gives the reason for such lowering of mastoiditis as paracentesis of the middle ear.

We have been given as the cars for middle ear conditions the respiratory troubles of the upper respiratory tract. We have cited adenoiditis as a cause for middle ear conditions. It has been stated that three of a certain number of hastoid cases were primary infection, not having trouble in the widdle ear. I am making these statements to suggest to you that there is some link between the causation and the condition of middle ear troubles that we are missing, and I want to bring up again the thought of the Eustachian tube, and suffice it to say that in the last two years I have found that seventy-five per cent of my middle for cases admit that they have blown the nose and felt it in the middle ear and felt it in the ear. I wonder if we shouldn't begin to think of prophylaxis of the middle ear. We have in an indefinite way. We are all advising children and they are doing so in

begin to indefine the indefine

health clinics, the drawing the mucous into the throat without the blowing of the nose. Will that not be our next step in the prophylaxis of the middle ear conditions?

We like to do things like cutting a hole in the drum membrane and things that suggest the mechanical handling of cases. Yet shall we not begin to think, although it is a little hard to do, of advising the simple thing the patient can do to prevent the case?

According to Boyle's Law the compression of gases in a closed cavity is as the square of the pressure, I believe, and if you put a pound of pressure on the containing gases in the Eustachian tube, middle ear and mastoid, you will drive that pound of air up into the middle ear cavity.

President Mellinger: Any further discussion? I see two pediatricians here—one, Dr. Manning, is a pediatrician of wide experience. Won't you discuss this paper?

Dr. Manning, Santa Barbara:

It is a pleasure to discuss Dr. Dowling's paper. I have brought him out many times at night when he wanted to stay home.

Regarding the two schools mentioned—whether the infection of the middle ear is secondary or whether it is primary, the more I think about it I can't help but think it is secondary in every instance, even in those cases which Dr. Lewis mentions which are mentioned in the works of Marriott of St. Louis and B. C. Jeans of Iowa City, of mastoiditis in infants. Even in this instance, I believe it is secondary to a respiratory infection in the upper part of the respiratory tract. The reason I believe that to be true is because we don't see (I don't and I have lived on the Pacific Coast for a good many years) that type of infant. In fact, we don't see cholera infantion. I think it was Hoskin first at St. Louis brought out the point that the mortality and morbidity in infants was not one of north and south. It was one of east and west. Wood Hutchinson brought out this same point in the popular articles he wrote in the Saturday Evening Post, and I do believe that our morbidity and mortally in infants is much lower on the Pacific Coast than east of the Soras or east of the Cascade Mountains. Therefore, we do not run to this type of infection Dr. Jeans speaks of and Dr. Marriott speaks of.

One other point brough out by Dr. Jesberg. I can't see why an individual trained to do diatrics can't tell whether an ear is red, or something about the ear. I believe that pediatricians do know that much now. I think the Lamb has had a great deal of experience in Boston City Hostofal and in the Cullens(?) Service and has heard and has heard and has heard and in scarled the same of the same of

pediatricians have long recognized that as a fact, but I think it causes the high temperature the infant would have from the otitis media, to which is due the intolerance for food and the diarrhoea, the same as we get with tonsilitis. I don't think it is the otitis media, but it is the temperature from the otitis media that causes the gastro-intestinal upset. I think we have to consider that about poorly cared for infants who are persistently vomiting their food and gastric juices are not secreting as they do in later life and the stomach contents are not sterile and the vomitus is thrown back into the pharynx, I think it is food for thought at least that a possible infection could come from the vomitus in the Eustachian tube and have an otitis media that way. It seems to me that the gastro-intestinal condition could be secondary to the otitis media or the otitis media secondary to the intestinal upset.

Dr. Dowling, closing:

I appreciate and am grateful for the discussion brought out, especially to the pediatricians. In speaking about doing a paracentesis, I think it is a pretty good rule to do a paracentesis if you are in doubt. I believe I stated that in my paper. Of course, many cases of otitis media come to us after they are infected for some little time and perhaps we are a little radical on that subject, because we see them twenty-four hours or forty-eight hours after they have had their symptoms, so we believe (perhaps we are a little biased, I don't know) that they should be incised at once and in my own practice, in my own experience that has been good practice, I think.

Dr. Woods speaks about scarlet fever and the few complications like mastoiditis following the early treatment of middle ear troubles. As you all know, scarlet fever is a treacherous disease. If there are any complications following an exanthema it is very likely to follow scarlet fever and when they do get a middle ear from scallet fever or mastoiditis, they are pretty sick as a rule.

I think we will all agree that the early theatment of middle ear infection, as indicated by Dr. Wood in his cases at the City Hospital in Los Angeles, means examine them early and often and treat them radically.

The doctor brought out the point about adenoids. I think it was well taken—the taking out of the adenoids.

Hans Brunner brought out in his lectures at Seattle last year that the opening of the ear drum in infants was a little difficult sometimes because the drum, as you know, anatomically slants away, slants down and in, and sometimes in the hurry to open the drum, or with poor anesthetic, the drum membrane is not open and the side of the wall is opened and they consider they have done a paracentesis. I have seen cases like that and it is well to be thought of. Another thing in these sort of cases and paracentesis a little of the technic of operation on the drum—you have to be a little careful not to disturb the stapes. I believe that is all.

believe believe

KERATOSIS OBTURANS OF THE EXTERNAL EAR

H. S. Muckleston, M.D., Los Angeles

Even so uninspiring a subject as the accumulation of dead skin in the external auditory meatus is worthy of bringing to the attention of a medical gathering.

The condition is one of accidental uncleanliness, rather than a diseased state primarily.

The accumulation of dead skin, shed hairs and more or less, especially less, cerumen in the deeper part of the ear canal furnishes a menace to hearing, to health, and at times to life.

This subject is not a new one for the consideration of otologists. Sixty or seventy years ago the pioneers in our branch of medicine, Toynbee of London, von Troeltsch of Wuerzburg, Wreden, knew it and wrote of their findings in patients under treatment, and in cases examined at autopsy. Toynbee dignified the condition by the name of molluscous tumor, Wreden called it keratosis obturans, and Politzer and many later writers used the term cholesteatoma of the external meatus.

Von Troeltsch in 1862 reported an autopsy finding in a case when such a mass filled the whole auditory passage, certainly a very old mass, and had caused a dilation of all sides of the canal, and a perforation of the membrana tympani, so that a part reached into the cavity of the tympanum.

ANATOMY

The external meatus is anatomically divided in the outer cartilaginous and the inner osseous portions, and is lined by a thin skin which becomes thinner and more delicate in the deeper part. The glandular elements of the skin are the sebaceous and the teruminous. These latter glands are analogous to the sudoriparous plands of the general body covering, and their activity varies in apequal degree; their number is estimated by Schwalbe to be from 1,000 to 2,000.

These wax glands empty upon the surface either close to, practically along with, the sebaceous glants or separate from them. They are a distinctive feature of the caltilaginous portion of the meatus, and of a small triangular part of the posterior wall of the osseous portion reaching almost to the annulus.

The skin is supplied also with a large number of minute hairs.

PATHOLOGY

The essential fault would appear to lie in a deficiency of the secretion of was rather than in an actual absence of the gland structure. Similarly in common experience there is a greater or less activity of the sweat secretion. In the latter field we may not assume that one indi-Digitized by vident is more richly supplied with sudiparous glands, and that another's skin is on the contrary impoverished in respect to honest sweat; the secretory inequalities are more likely a result of different innervation and different degrees of endocrine nicety.

One may observe with interest how often patients with dry, scaly ear canals, in whom the color of cerumen is almost or totally lacking, will report that they hardly know what it means to perspire. This is not always the case, but it is true in a striking proportion of cases.

There is an undoubted racial tendency to dryness of the meatus externus, very marked, for example, among the Japanese.

Just as the detritus of dead keratinized cells gathers itself into lamel-lated masses in the recesses of the mastoid antrum, forming the well-known cholesteatoma, so the same kind of debris, lacking the skin's lubricant, cerumen, can and does form lamellated plugs in the outer ear canal. The youngest recruit in the ranks of otology knows that some masses in the ear are rich in cerumen, and that others are devoid of brown or yellow color, also that plugs of cerumen are not menacing to the surrounding tissues. But a man may be in practice many years and not encounter a case where the dry or wax-less canal contains a mass capable of giving rise to real pathological lesion. The writer recalls only two such cases, and the very rarity of the condition has justified to him the presentation of this paper.

The presence of a mass of dead skin in the canal, by its increasing size, its growing density, its unintermittent pressure, its bacterial flora, will result in the long run in changes in the wall of the meatus. Baurowicz observed granulation tissue springing from the wall at a point or points corresponding to the edge of the mass. These granulation tissue growths may confuse the examiner, as they excite at once a suspicion of osteitis starting in the mastoid cells. The writer was seen a polyp mass attached to the roof of the ear canal which disappeared completely in the course of a few weeks, following the cleaning of the canal and with little attention to the polyp itself; and existing of the skin lining the canal, in its roof, and deep in the inner and near the annulus, with bare bone recognized by the probe.

In other instances, without ulceration of the skin, the bone underneath is affected by the mass in the anal. A process of bone absorption goes on, with a symmetrical widening of the meatus recognizable in the roentgenogram. Bilancion reports such a case where the bony meatus on the right side was four times as large as that on the left. Bauriwicz reports also local excavations of the wall, filled with exfoliated skin cells, but with an intact, even if smooth and atrophic, skin.

Changes in the metabrana are very inconstant. The writer's limited experience has not brought to his notice any material change. Others report cicatricis thickening and perforation.

Microscopical examination of the detritus shows broken up skin cells, single or in sheets, and great numbers of cholesterin crystals. No bacterial records are noted.

Microscopical examina cells, sincle or in sheets, an bacterial records are noted.

SYMPTOMATOLOGY

It is remarkable that in general patients do not complain of pain. They have a sense of fullness, of blocking, and of impairment of hearing which is of slow development, rarely of dizziness.

A discharge from the ear is not a necessary accompaniment. In the case of a child under the writer's care the parents had seen pus coming from the ear only one day prior to her being brought for treatment. Yet in her meatus were granulation areas and swelling of the skin and a mass deep in the direction of the membrane which took three weeks to remove. Her report follows:

C. Y., a Japanese girl of six years, seen on January 3, 1925, suffering from a purulent discharge from the right ear, noticed since the previous day, and from boils on the leg. In the right ear could be made out granulation tissue on the roof of the canal, and beyond this a mass of epithelial debris which was not freed by syringing. Repeated attempts were not more successful, and finally on January 23 she was put under ether. The granulations in the roof were curetted and the mass of detritus carefully scooped out. Areas where the bone was denuded of its covering were recognized in the roof of the meatus and on the real wall near the annulus. Four days later the tympanic membrane could be well seen; it was intact; the child could hear the whispering voice at fifteen feet. The material removed was examined, and found to consist of disintegrated cells interspersed with cholesterin crystals. After a few weeks the skin of the canal became smooth, the granulations having entirely disappeared. Ten months later she returned, and a collection of soft white debris was washed out, Seen in March of this year for a check-up, she has normal ear canals, few whitish flakes, practically no trace of wax; her hearing is formal on both sides.

TREATMENT

Little need be said under this heading. The mass must be removed with all possible gentleness. It may little directly on the ear drum, and injury to this structure could easily be done.

Granulations will call for particular attention; snaring, cauterization, or such antiseptic handling as by alcohol, Aristol powder, or the like.

DIAGNOSIS

The ulceration of the skin may be mistaken for, or may be masked by, boils.

The presence of a polyp hanging from the roof of the canal is bound to suggest to the examiner a chronic suppurative mastoiditis, especially where there is an exposure of bone. So also would he be influenced by granulations on the posterior wall.

Suchdoubts will be declared by patience and by repeated examination. The recognition of a normal drum membrane, and the retention of normal or approximately normal hearing, will reassure the mind.

The roentgenogram may clear up the question quickly. In the case herewith reported, no X-ray examination was made, because once the canal was cleared the course to full recovery was direct.

The history of the case should be gone into carefully. In a straight case of keratosis obturans there will be no history of an earlier otitis media, of long continued suppuration, of headaches, of dizziness.

The condition dealt with today is not one of major pathology, but in some aspects it verges on this. Simple in its etiology, it is in the main easily treated, and the outcome should be good.

Discussion opened by Dr. Walter Crane, Los Angeles:

Dr. Muckleston deserves credit for presenting a paper on such an apparently simple or minor subject. They say that it is the simple things in life that count and these patients whose ceruminous glands do not function properly are certainly often quite uncomfortable, to say the least. They sometimes have trouble—whether because of the failure of the glands to function properly is a question. Dr. Muckleston has suggested the association or relation to the general sweat gland system and I have wondered whether there was any relation to the throat, because we all see at times the ear pain or the ear itching that is relieved by removing a plug from a tonsil crypt and we are perfectly familiar with the reflex cough that occurs when we treat the ear at times. There is a definite reflex relation between the throat and the canal, and I have wondered whether there is any relation between diseased tonsils and this lack of function on the part of the ceruminous glands.

The course of symptoms, first, the lack of the cerumen causing a dry ear and itching, a scaling of the skin, and patients scratch their ears, and another symptom that is related to the same cause is the presence of infections in the canal.

Second, the exfoliated skin becomes a large enough mass to form a plug which takes the form of the canal and blocks off the air access to the tympanic membrane and causes the lowered hearing, the full sensation of which they complain; and third, the pressure symptoms, and there we may have pain, particularly if the pressure is great or if exerted against the drum.

I recall a case I saw a year or so ago that had been neglected for a long time and the pain had continued for some time and on removal of the mass of debris there was an ulcer of the drum which broke down within a day or two are formed a perforation and the middle ear became infected and there was a quite long drawn out otitis media, apparently originating from the pressure of debris on the drum, and recently I saw a similar case in which the pressure against the drum had caused some ucceration but no perforation.

Dermatities frequently set up in the presence of a large mass of exfoliated thin, particularly if water penetrates into the canal and softens the mass and gets underneath the mass and you remove a plug that forms just a cast of the canal and drum and the surfaces of the

canal and drum are red and inflamed, and the patient comes back in a day or two and the irritation and dermatitis has caused more skin to be exfoliated and certain exudate is formed and another cast can be removed, unless it is treated more or less persistently.

The treatment, of course, is removal and cleansing and I have found that ether helps a great deal in cleansing and then mild ointments, and for the treatment of the cause, ointments for the dry canal.

Dr. Muckleston, closing the discussion:

I have practically nothing to say further except to thank Dr. Crane for his discussion. I am not talking about infections, but this rare and peculiar exanthema of the meatus. I have only seen two cases and I only bring it up because when I first reported this particular Japanese child, my diagnosis was disputed. One man insisted that it was mastoiditis because of the scleromatous material. I wanted to show that such a thing can occur and be mistaken for a chronic mastoiditis.

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ELECTRONYSTAGMOGRAPHY

A GRAPHIC STUDY OF THE ACTION CURRENTS IN NYSTAGMUS

I. Leon Meyers, M.D., Los Angeles, Calif.

Graphic records of the eye movements in nystagmus can be obtained, I found, by means of the electrocardiograph. The records, like the electrocardiogram, are based on the fact that a muscle under the influence of a stimulus, including a nerve impulse, is traversed by a wave of negativity, the so-called action current, immediately preceding its contraction. The current, if led off through a string galvanometer, produces a deflection of the suspended thread between its magnetic poles, the direction of the deflection varying with the direction of the current. A photograph of the deflection when obtained on a moving film, thus furnishes a record not only of activity in the muscle, but also of the origin and course along which the current is propagated. The current passes, of course, from the point of higher to that of lower potential, and accordingly, the point at which it enters the galvanometric arc of the circuit is designated the positive pole, the point at which it leaves this arc the negative pole. These poles have each, however, a directly opposite function in their relation to the course of the current through tissues of the body, more specifically, the acting muscles, in which part of the circuit of the current flows in the exactly opposite direction.

In nystagmus, horizontal as well as rotatory, the eyes move conjugately in one or its diametrically opposite direction. They do this not only in nystagmus to the different poles of the plane, but also during each cyclic process of the phenomenon, a composite process consisting of a slow movement of the eyes in one direction, which is immediately followed by a quick movement in the opposite direction. Antagonistic groups of muscles are thus affected in these different types of eye movements, the resulting flow of current varying with the position and direction of the groups of muscles in action. It can, therefore, be observed that in a person with nystagates, if the temples on the two sides of his body—essentially bony structures which as depositories of inorganic salts form an excellent conductor of the electric current, are connected with the electrocardiograph, thus allowing the action currents from the contracting massles of the eyes to be led off through the string galvanometer, characteristic record is obtained which shows a distinctive curve of each type of eye movements. (It is to be noted that with the corodes to the temples the circuit is completed distally to the sphere of action of the heart muscle, and it is consequently unaffected by the action current from this organ.)

The electrodes, about three inches in diameter, were made of block

tin shaped like a horseshoe. They were covered with rubberized cloth on the outside and several thicknesses of gauze wet in saturated salt solution on the side near the skin.

The patient's face was washed with soap and warm water and the electrodes were applied to the temples with the open side of the horseshoe towards the eyes, extending for about one inch upon the forehead above and the malar prominence below. The two electrodes were held in place by bandages secured tightly around the upper part of the head and face.

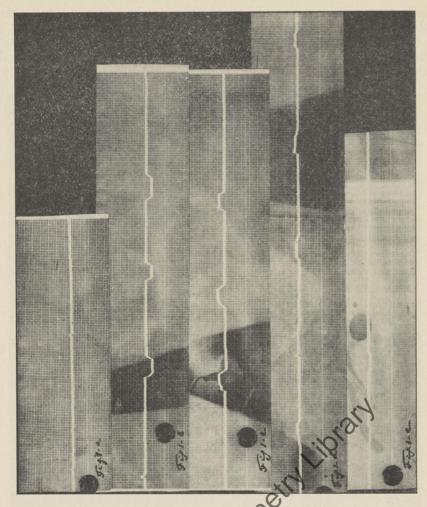
In all records, unless otherwise stated, the right electrode (the one usually applied to the right arm in electrocardiography) was placed over the right temple. The other was applied to the left temple. All deflections of the string recorded above the base line, therefore, indicates negativity of the right side of the head, and represent an electrical current passing in the patient from the right to the left and continuing from the left temple through the galvanometer, completing the circuit at the right temple. All deflections of the string recorded below the base line represent an electrical current in the opposite direction.

In all records, unless otherwise stated, the string of the galvanometer was slackened and calibrated so that it would deflect 2 cm. for each millivolt of current introduced. This was done in order to magnify the excursion of the string caused by the very feeble electrical current. An excursion of one millimeter above the base line represents an E. M. F. of 0.00005 volts.

In most records the skin resistance measured between three and four thousand ohms. As a rule the resistance was not high and in few records it was almost nil. The patient was instructed to place himself during an experiment in a state of complete relaxation, and to keep his eyes closed. This was done in order to eliminate as far as possible any currents from the action of other muscles.

THE INTERPRETATION OF THE RECORDS

To enable us to interpret a record of nystagmus, it will be well to note first the graphic representation by this method of movements of the eyes carried out voluntarily (1988. 1-b—1-e and 2-b—2-e). It will be seen from Fig. 1 that movements of the eyes "to the right" (movements which were initiated by a deviation of the eyes from a fixed, primary position in the didline to the extreme right) (Fig. 1-b) are indicated by waves, sedi-quadrangular in shape below the abscissa, and that movements of the eyes "to the left" (movements which were initiated by a dayadion of the eyes to the left) (Fig 1-c) are indicated by similar was above the abscissa. The waves are seen to be composed of the phases, namely, a downstroke which is followed by a pause which in turn is followed by an upstroke in movements of the eyes "the right," and an upstroke, followed by a pause, which in turn followed by a downstroke in the case of movements of the eyes "the left."



"Electromyograms" of voluntary movements of the eyes by a normal person with the electrod applied to the temples.

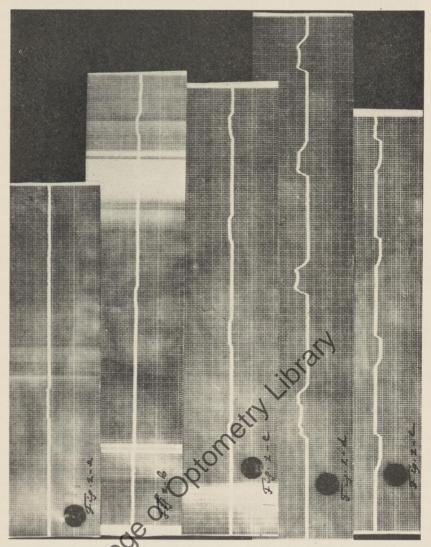
Fig. 1-d—Looking up. Fig. 1-e—Looking down. Fig. 1-a-Looking straight ahead. Fig. 1-a—Looking to the right.

Time mar Done-fifth of a second.

The first phase, somewat oblique in direction and having a duration of about 1/12 to 10 of a second, represents the primary deviation of the eyes from the midline. The pause, varying in duration and representated by a horizontal line, is the period during which the eyes are held in the deviated position. The third phase, represented by a wave which is similar in character and duration to that of the primary phase, is the period during which the eyes return to their original position. It will be noted that the wave of the third phase representing, aightized by

as it does, a relaxation of the contracting muscles, extends only to the abscissa and does not go beyond it.

The records show further that with the electrodes on the temple. movements of the eyes in the vertical plane (i. e., up and down) provided, of course, that they are not associated with movements laterally,



"Electromy of woluntary movements of the eyes by a normal Derson, with "Left" electrode above left eye and Y'Right" electrode over superior maxilla.

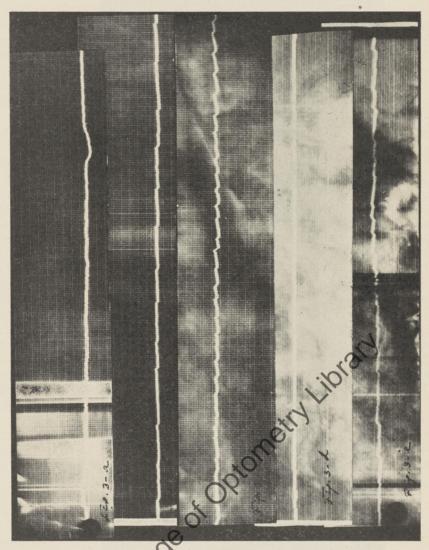
Fig. 2-d—Looking up. Fig. 2-e-Looking down.

Time marks one-fifth of a second.

Fig. 3—Looking straight ahead.
Fig. 3—Looking to right.

Time mart

are not accompanied by a definite flow of current through the galvanometer. Such movements are, however, indicated by large waves similar in character to the waves obtained from movements of the eyes in the horizontal plane, if the electrodes are applied in the vertical plane and



"Electronysiasmogram" from a normal person. Caloric Nystagmus.

ubject is in a sitting posture.

-Before irrigation.

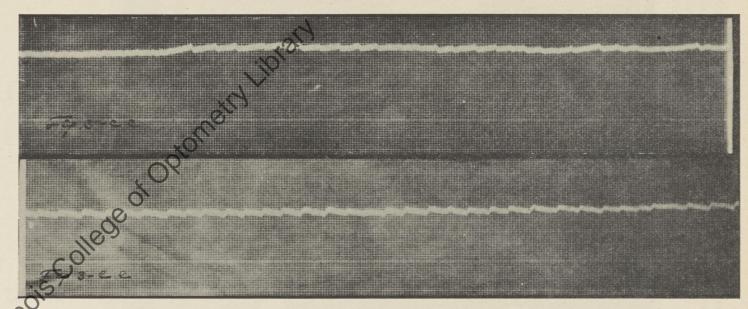
3-b—Stimulating right vertical canals.

Fig. 3-c—Stimulating right horizontal canal.

Fig. 3-d—Stimulating left vertical canals. Fig. 3-e—Stimulating left horizontal canal.

Time marks one-fifth of a second.

GigitiZed by Illin



"Electronystagmogram" from a normal person. Caloric Nystagmus.

Fig. 3-cc—Stimulating right horizontal canal. Subject in the recumbent posture. Fig. 3-ee—Stimulating left horizontal canal. Subject in the recumbent posture.

5. 5-ce Stilliaming left horizontal canal. Subject in the recal

Time marks one-fifth of a second.

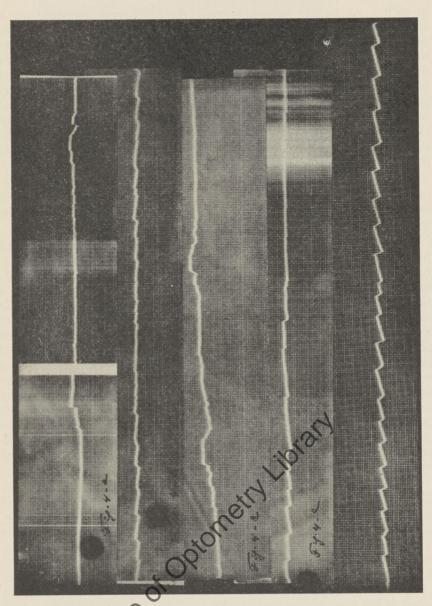
in such a manner as to have the eyes between them as when one is applied to the forehead and the other to the superior maxilla or the suboccipital region. A record of such movements of the eyes when the other to the superior maxilla below this eye is shown in Fig. 2. The direction of the deflection of the suspended thread of the galvanometer in movements of the eyes laterally, a type of movements to which my studies have been so far mainly devoted, thus shows that in conjugate movements of the eyes to the right, the area in contact with the electrode on the right temple is in its relationship to the galvanometric circuit positive to the corresponding area on the left temple, and that the reverse obtains in conjugate movements of the eyes to the left.

In mystagmus, a phenomenon consisting of a series of cyclic processes, each of which is made up of a slow movement of the eyes to one side which is followed by a quick movement to the other side, the records show a corresponding series of successive cycles.

Each of these cycles is seen to be made up of a somewhat prolonged wave which passes obliquely in the direction below the abscissa and is followed by an upstroke which in turn is followed by a short pause, in the case of nystagmus to the left (Figs. 3-b, 3-c, 3-cc) and by a similar wave which passes in the direction above the abscissa and is followed by a downstroke to be followed by a pause in the case of nystagmus to the right (Figs. 3-d, 3-e, and 3-ee). The prolonged phase, indicating a comparatively slow deflection of the suspended thread of the galvanometer corresponds in direction with that of a voluntary movement in the direction of the slow component of the nystagmus; the upstroke or downstroke, on the other hand, indicating a quick return movement of the deflected thread, have a direction which corresponds with that of a voluntary movement in the direction of the quick component. We may, therefore, unhesitatingly assume that these phases in the record represent the slow and the quick components of nystagmus.

These phases, the slow and the quick, have the rally the same range of movement, the eyes during the second phase returning only to their original position and not going beyond it. This is, however, not invariably the case, and in certain pathologic conditions we note that there is no correspondence between these two. This, in conjunction with the fact that the quick phase is under creain conditions subject to modifications of its own, becoming prolonged and undulatory in character (Fib. 6-c) shows that this phase is not merely a passive process, a recoil of the eyes due to a refexation or inhibition of the muscles which brought about their primary deviation, but is an active process and is brought about by a charaction of the antagonists of these muscles. This is in accordance with the fact which I brought out in a previous communication (1) that the quick component is abolished by a lesion of the motor to the which normally activates the muscles moving the eyes in the direction opposite to that of the primary deviation. Generally, in the normal state, the duration of the primary deviation is about one and one-half to two times that of the return movement,

ally, in about of



"Electronystage of gram" from patient with congenital internal squire on the right side. Caloric Nystagmus.

Fig. 4-a—Before irrigation.

Fig. 4-b—Stimulating right horizontal canal.

Fig. 4-c—Stimulating right vertical canals.

Fig. 4-e—Stimulating left vertical canals. Fig. 4-d—Stimulating left horizontal canal.

Time marks one-fifth of a second.

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the duration of the later corresponding with that of a voluntary deviation of the eyes (1/12 to 1/10 of a second). (2) The duration of the pause varies within wide limits. It is usually much shorter than the pause during the voluntary movements of the eyes (which for the purpose of these experiments have been executed within the shortest possible space of time). As a general rule the duration of this pause varies inversely with intensity of the primary deviation, i. e., the stronger the pull of the eyes from their primary position at or near the midline the shorter the pause in which the eyes remain there, so that in certain cases with a markedly accentuated labyrinthine response (Figs. 5-d, 5-e) there may be a total absence of this pause.

It should be noted further that the rotatory type of nystagmus which is also recorded by this galvanometric method (Figs. 3-b and 3-d) shows, like the horizontal type, a primary and secondary phase, as well as the pause. There is, however, a clear and unmistakable difference between the records from these two types. The primary deviation, in the rotatory type, is shown clearly to be lacking in force, and in correspondence with this, the pause is very much prolonged.

THE ORIGIN OF THE ACTION CURRENTS IN NYSTAGMUS

As to the muscle the excitation of which in conjugate movement of the eyes gives rise to the current, our studies indicate that during the slow phase it is the external rectus muscle on the side toward which the eyes are moving and not the internal rectus on the other side that is responsible for it. The current during this phase is found to be greatly diminished (Fig. 4-c) in affections of the former muscle regardless of the fact that the contralateral internal rectus muscle functions normally, and to be unaffected by a paralysis of this latter puscle (Fig. 5-e). During the succeeding quick phase, on the other hand, the current may be led off either from the external rectus of the eye toward which the return movement takes place (Figs. 5-b and -c) or, if this muscle is paralyzed (Fig. 4-d) from the contralatered internal rectus. In other words, during the slow phase the current led off through the galvanometer is the one that originates in close proximity to its positive pole, in the ocular muscle that is subjacent to it, whereas, during the second phase the current may be led off even though it originates quite a distance away from this pole, the internal rectus in the contralateral orbit. The reason for the greater in thisity of the current during the second phase is probably to be found in the fact that the quick phase is the more vigorous of the two of t is to be noted, however, that during either of these phases the carrent enters the galvanometer on the side of the body toward which the contracting muscles and its nerve impulses are directed. It enters it, e. g., on the right side from the external rectus of the right exp or the internal rectus of the left eye, either of which muscles is directed forward and to the right.

A street by this method of induced (caloric or optic) nystagmus in patient with ocular or intracranial lesions gave the following results:

patient patient patient

CASE I. (Paralysis of right abducens. Weakness of right internal rectus due to tenotomy. Nystagmus was induced by irrigating ears with water at 68 degrees. The records obtained are shown in Fig 4.)



"Electronysta mogram" from patient with paralysis of right oculo-mot Qus and Divergent squint. Caloric Nystagmus.

Fig. 5-a—Before irrigation.

Fig. 5-b—Stimulating right vertical canals.

Fig. 5-c—Stimulating right horizontal canal. Fig. 5-d—Stimulating left vertical canals. Fig. 5-e—Stimulating left horizontal canal. Time marks one-fifth of a second.

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Victoria B., L. A. General Hospital, No. 276-721, a school girl, aged 15, has had a right internal squirt ever since birth. The squint formed an angle of 45 degrees when the left eye was directed straight ahead. Vision in the right eye was practically lost. No involvement of the other cranial nerves. No impairment of motion or sensation in any part of the body. Speech and intelligence are normal. Wasserman on the blood is negative. Dr. Theodore Lyster performed on her an advancement of the external rectus and a tenotomy of the internal rectus on the right side on Sept. 9, 1927. Condition at present: Can move right eye to the midline, but cannot maintain it in the latter position, the eye tending to deviate toward the inner canthus.

CASE II. (Complete paralysis of the oculomotor nerve on the right; hemiparesis on the left side. Cerebrospinal lues. Records from induced labyrinthine nystagmus by irrigating ears with water at 68 degrees are shown in Fig. 5.)

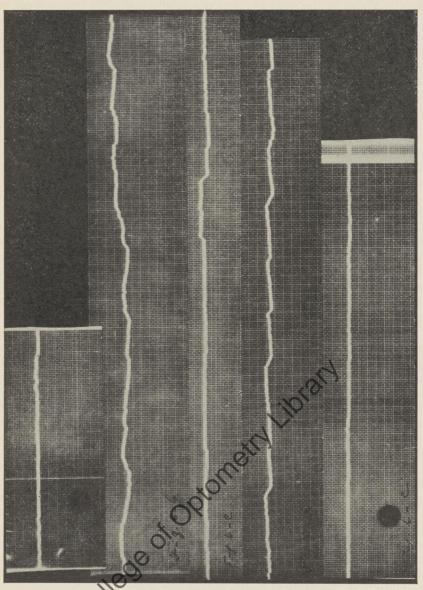
Jessie H., L. A. General Hospital, No. 66-003, colored, aged 30. On January 10, 1928, she began to suffer from pain over the left eye. This lasted for about a week, when her upper lid drooped, so much so that the eye became completely closed, and remained in this condition ever since. On January 21, 1928, she noticed some difficulty in holding objects firmly with the left hand. The weakness, within twenty-four hours, extended to the entire left side. She has had no vomiting, no visual disturbances and no tinnitus. Examination at present (February 28, 1928) reveals the following:

Complete paralysis of the right oculomotor. The pupil is dilated and fixed and the eye is in complete divergence and cannot be moved upward or inward. No involvement of the other cranial paresis. Hemiparesis on the left side, involving face, arm and te, with spastic reflexes on that side. No clonus. Inconstant Bahaski on that side. Deep reflexes on the right side are hyperactive, but plantar response is normal. Slight impairment of sensation of all ypes on the left side. Discs show clear margins, but veins are prominent and tortuous. Blood pressure is 118-96.

It will be noted that the record obtained from this patient on stimulating the right labyrinth with water at 68 degrees, while she was upright with head 30 degrees forward, yielded a nystagmus which was horizontal instead of rotatory; the normal nystagmus for this posture. This is undoubtedly due to the paralysis of the superior and internal rectus as a result of which the right eye could not be moved upward and the deviation of the ve, perforce, had to occur in the horizontal plane. A true rotate of nystagmus is, however, obtained from

Total P., L. A. General Hospital, No. 3349, Italian boy, aged 13 years, began to have pain in his occiput, neck and over his eyes in the

early part of February, 1928. Previous to this he is reported to have been well. A few days after the onset of the headache, he began to vomit. Vomiting was projectile in character. He also noticed blurring



"Electron tagmogram" from patient with tumor of left hemisthere of the cerebellum. Caloric Nystagmus. Aiditized by Illinois

Fig. 6-a—Before irrigation.

Fig. 6-b—Stimulating right horizontal canal. Fig. 6-c—Stimulating right vertical canals. Fig. 6-d—Stimulating left horizontal canal. Fig. 6-e—Stimulating left vertical canals.

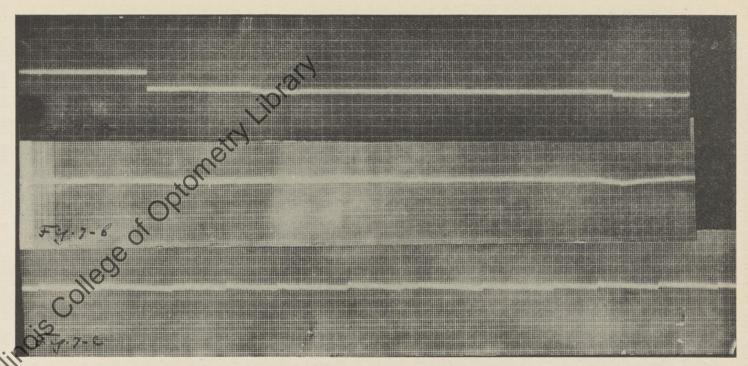
Time marks one-fifth of a second.

of vision, from which he has suffered, however, from a minor degree, his mother states, for several months before. Neurologic examinations. Patient is fairly intelligent and co-operates in his examination well. He is able to walk, but tends to deviate to the right, and to fall to the right on walking in a straight line. Shows a tendency to have a "cerebellar attitude of the head," in this case, an inclination of the occiput toward the right shoulder. Past-points persistently with both hands to the right. Tremor and hypermetria (or exaggeration of all active movements) in both hands. Pupils are somewhat dilated, equal and react to light and accommodation. Ocular movements are carried out in all directions. Slight spontaneous nystagmus on looking either to right or left, more marked in looking to the latter direction. No vertical nystagmus. Discs are markedly choked, showing an elevation of about 6D. A good deal of vision is, however, preserved. No hemianopsia. Face appears to be somewhat weak on the left side—the palpebral fissure is wider on that side. Hearing is unimpaired, with AC better than BC on either side. No involvement of the 5th. No involvement of the palate, pharynx, larynx, or tongue. Deep reflexes are diminished on both sides, in the arms, as well as the legs. A tendency to a Babinski on the right side, and a normal plantar response on the left side. Superficial reflexes are present on both sides. No impairment of speech. Sensation is normal everywhere and no astereognosis. Bladder function is normal. Wasserman on the blood as well as spinal fluid is negative. The fluid is clear; is under greatly increased pressure (30 mgms of mercury) and has a cell count of three lymphocytes per cmm. Its sugar content is reduced. X-ray report: Cranial vault is quite thin, especially in the frontal area, with very prominent convolutional markings. Pituitary fossa are normal in size and shape. Clinoid processes intact.

Neuro-otology (as noted upon visual observation). Douching right ear with water at 68 degrees with the patient upright and head 30 degrees forward gave rise to a few oscillatory icks of the eyes, but no true nystagmus, although irrigation was consided for over three minutes. He points correctly with both hards, with head back—a horizontal nystagmus to the left was produced which was of good amplitude. He past-points two inches to the right with the left hand, and points correctly with right hand. Douching with cold water the left ear, with the patient upright and head 30 degrees forward also produced no nystagmus. He past-points then two inches to the right with the right hand and points. Or rectly with the left hand. With head 60 degrees back—a good metagmus was produced which was horizontal in type. He past-points about three inches to the left with the right hand, and points correctly with the left. There was no constitutional response on stimulating either labyrinth.

It is seen tom the history of this case that the question as to the location of the tumor, whether it was in the right or the left hemisphere of the cerebellum, was difficult of solution. The cerebellar attitude of the head, the tendency to deviate and fall to the right, the

pnere of tude of



"Electronystagmogram" from patient with right homonymous hemianopsia. Optic nystagmus.

Fig. 7-a—Looking straight ahead before rotation of the drum (see text) was started.

Fig. 7-b—Rotating drum clockwise.

Fig. 7-c—Rotating drum counterclockwise.

Time marks one-fifth of a second.

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spontaneous past-pointing to the right, his pointing correctly with the right hand when horizontal nystagmus was induced from the right labyrinth, suggested the tumor to be in the right hemisphere. On the other hand, the slight weakness of the face on the left side with the tendency to a Babinski on the right side and his pointing correctly with the left hand when horizontal nystagmus to the right was produced from the left labyrinth, indicated the tumor to be in the left hemisphere (the fact was at the same time taken into consideration that, as our experience has repeatedly proved to us, the weakness of the face in tumors of the cerebellum, may occur contralaterally to the lesion and the Babinski sign homolaterally to it).

On studying the records of the induced nystagmus as obtained by the string galvanometer (Fig. 6) we note a persistent tendency for the eyes to be deviated to the left regardless of whether horizontal nystagmus was produced to one side or the other. This is shown by the prolonged slow phase in the case of nystagmus to the right (Fig. 6-e) as well as by the tendency of this phase to be short irregular and oscillatory in character in the case of nystagmus to the left (Fig. 6-c). The quick phase in the latter type of nystagmus, on the other hand, tends to be unduly prolonged, in other words, to maintain the eyes in their deviated position to the left. The nystagmus to the left is, in fact, seen to be associated with an almost continuous deviation of the eyes to that side. This could be best explained, I thought, by the assumption that the tumor is situated in the left hemisphere of the cerebellum, in view of the fact that, as I showed by experimental studies reported in previous communications (2) a lesion of the cerebellum on one side results in hyperactivity of the contralateral motor area of the cerebellum. A lesion of the left hemisphere of the correlation would be consequently associated with hyperactivity of the motor cortex on the right side, which, as is the case of a hemiplegia on the right side, from a lesion of the motor cortex or internal capsule on the left side, produces a conjugate deviation of the eyes to the left side. The quick component in the case of nystagmus to the left, it will also be noted, is undulatory, or tetanic in character, a type of movements which, in accordance with the studies of Piper (), and Wertheim Salomonson (5), is indicative that it is cerebral in origin.

The patient was operated on Dr. Geo. H. Patterson, March 15, 1928. The operative report follows:

Left cerebellar lobe was on palpation felt to be firmer than the right. A lobullated mass of tumor tissue was found in that lobe. In the anterior part of lobe there was greenish grey discoloration. Ventricle needle placed in the left cerebellar lobe met with firm resistance and went but what was a hard tumor. The needle in the opposite lobe was soft and had a normal feeling.

Patient showed a tendency to collapse, and removal of the tumor was presponed. He left the hospital on April 4, 1928, to return for secondary operation at a later date.

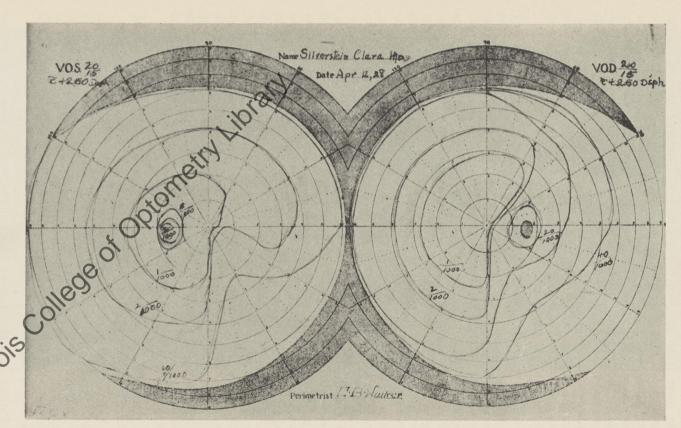


Fig. 8. Perimetric chart of patient referred to under Fig. 7.

Fig. 7 is a record of optic nystagmus ("railroad" nystagmus) in a case of a glioma of the left occipital lobe with an homonymous hemianopsia on the right side. To produce this type of nystagmus we have caused a kymograph drum, covered with alternate strips of black and white paper to rotate before the patient's eye, at a distance of about two feet, while he was fixing his gaze on it. Normally, under these circumstances, rotation of the drum clockwise, from the right toward the left side of the patient, produces nystagmus to the right, whereas rotation of the drum in the opposite direction, or counterclockwise (for which purpose the kymograph was held in the inverted position with the rod carrying the drum riveted to its base) produces nystagmus to the left. There is a diversity of opinion as to the effect of hemianopsia on this type of nystagmus. Barany (6), and Strauss (7), maintained that hemianopsia abolishes such nystagmus toward the non-seeing half of the field and that the loss of such nystagmus to one side may be accepted as evidence of a loss of vision in that part of the field. Fox and Holmes (8), on the other hand, deny this. These authors maintain that optic nystagmus is independent of the integrity of the visual field, that its loss in certain lesions of the brain is determined by an as yet unknown factor, but that it may be brought about by a break in the reflex arc of this nystagmus, which, according to them, passes through the occipital and frontal lobes.

Case IV. (Glioma of the left occipital lobe, the major part of which had been removed by Dr. Harvey Cushing on February 10, 1927. A right homonymous hemianopsia, complete in the lower quadrant and incomplete, vision for larger object being retained for a considerable distance to the right of the median line, in the upper quadrant.) (Fig 8.)

Mrs. Clara S., a private patient, gives the following history: She is 34 years of age, and has always been in good health until the age of 22 years, when she suffered from a nervous breakdown, having become unusually irritable, despondent and unable continue her work. She was working as a secretary in the District Attorney's office then, and she attributed it to overwork. This "breakdown" was not very severe and she recovered in a few mortic. She had another similar, but more severe, attack in 1924, when she became very much depressed, thought that everybody was against her and considered suicide. She spent a few months at sanitaritim and recovered. She felt well until December, 1925, when she had a convulsion. This occurred in the middle of the night, while she was asleep. Husband reports that the convulsion was generalized, that she bit her tongue, frothed at the mouth and could not be aroused. The following morning she had an extremely severe headache and felt nauseated. She had another similar attack in while, she states, she was not completely unconscious, a month later and still another attack, mild in character, in April or May, the Following each of these attacks she had a headache and felt nauseated. She has had no more convulsions or fainting spells

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"Electronystagmogram" from patient with tumor in posterior fossa. Spontaneous nystagmus.

Fig. 9-a—Looking to right. Fig. 9-b—Looking to left.

Time marks one-fifth of a second.

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since, but has had headaches, mostly in the back of her head, which occurred at irregular intervals and were at times very severe. No vomiting since last attack.

Neurologic examination: Patient is alert, of good mentality, and careful about her appearance and dress. Pupils are medium in size, equal and react to light and accommodation. Ocular movements are normal. No nystagmus. The discs show an elevation of about 4D. The margins are completely obliterated and cups are invisible. No hemorrhage or exudates. Vision is preserved. Patient is able to read newspaper with ease, but shows an homonymous hemianopsia on the right side. All the other cranial nerves are normal. Hearing is unimpaired on either side, and AC is better than BC. No impairment of motion or sensation anywhere in the body. The deep reflexes are within the normal range, the right patellar being, however, a little more active than the left. Occasional tendency to a Babinski on the right. Abdominal reflexes present on both sides. No Oppenheim or Gordon. No tremor or ataxia either in the arms or legs. Patient is right handed and shows no disturbance of speech of either aphasic or dysarthric character. Stereognostic sense seems perfect on both sides. Wasserman on the blood is negative. Patient was referred to Dr. Harvey Cushing, Boston, who removed the chief mass of the tumor, which was a glioma of the left occipital lobe.

Patient at present (March 15, 1928) is in excellent condition. Aside from the right homonymous hemianopsia, the extent of which is shown in Fig. 8, and partial atrophy of the discs, she shows no signs or symptoms of an intracranial disease, motion, sensation, mental condition and speech being entirely normal.

On studying optic nystagmus in this case it was found that clockwise rotation of the drum—which would normally produce nystagmus to the right—produced no nystagmus (Fig. 7-b) whereas rotation of the drum counterclockwise produced a normal hystagmus to the left (Fig. 7-c).

The result in this case coincides with the findings of Barany, and Strauss, that hemianopsia abolishes optic nystagmus toward the non-seeing half of the visual field.

Fig. 9 is a record of spontaneous nystagmus on looking to the right and to the left in a patient (E.A. General Hospital, No. 8441) with what clinical evidence shows to be a tumor in the posterior fossa. He is unwilling to undergo an operation at the present time.

Fig. 10 is a record of spontaneous nystagmus of the visual type which was obtained from a woman, aged 30 years, who is an Albino. It will be seen that the nystagmus in this case is prendular and oscillatory in character, and does not present the typical slow and quick components of labyrinthine or optic nystagmus.

In thing I wish to acknowledge my indebtedness to Dr. Ph. Berman Cardiologist to the Los Angeles General Hospital, and Drs.

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"Electronystagmogram" from Albino. Spontaneous (Visual) Nystagmus. Fig. 10-a—Looking straight ahead. Fig. 10-b—Looking to left. Fig. 10-c—Looking to right.

Time marks one-fifth of a second.

Leo Adelstein and Eugene Ziskind, Juniors on my service, for their painstaking assistance in carrying out this work.

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THURSDAY MORNING SESSION

April 19, 1928

President Mellinger: The meeting will come to order. There are a few announcements to be made first. (Not recorded.)

Telegrams from Dr. F. A. Kiehle and Dr. Wilson Johnston read by Secretary Hoffman.

President Mellinger: We are conducting this meeting by the use of a timer. Dr. Hoffman operates this machine. Papers are limited to twenty minutes, as you know. The opening discussion is limited to five minutes and others to three minutes. We try to adhere to that as closely as possible.

The first paper is "The Comparative Value of Glaucoma Operations," by Dr. Luther C. Peter, of Philadelphia. He has traveled all the way from Philadelphia and has just arrived in time.

Dr. Luther C. Peter: Mr. President and Members: I deem it quite an honor to have been invited to contribute to your program, because it gave me an opportunity to get away from business and come out and meet so many of you whom I have been seeing in the past, on your own ground. I assure you it is a very great pleasure to be with you to take part in your session.

THE COMPARATIVE VALUE OF GLAUCOMA OPERATIONS

Luther C. Peter, M.D., Philadelphic Senn.

It is within the range of possibilities in the Mure that we may find some non-surgical method of controlling july-ocular tension in glaucoma. This is a prediction of twenty years standing. For the present and the immediate future, however, the gery will continue to play a dominant role in the preservation of the fields and the control of tension in a large number of cases. This communication is based on the premise that the time for sugery has arrived in a given case, if useful vision is to be preserved. No one can gainsay the fact that, in selected cases, miotics and other medical measures have been sufficient to preserve useful vision, during the lifetime of a patient. In the experience of others of large experience, it is equally true that many have lost their with because of the withholding of surgery when medical measures failed.

Assuming, therefore, that properly selected surgical procedures are of distinct. Give, we are interested in determining the relative value of each method, and if possible, the best type of operation for a given case. This is the reason for offering an individual operator's experience in the management of one of the most complex types of ocular disease

which is encountered in daily practice. As pointed out in a former communication before the West Virginia State Medical Society, in my personal experience in private practice, more than six per cent of all new cases, seen for a number of years past, have suffered from glaucoma. This percentage may seem to be higher than that of many individual ophthalmic surgeons, but it is interesting to note that in Col. R. E. Wright's official report of the Madras Ophthalmic Hospital for 1926, seven per cent of the 3,705 patients admitted to the hospital suffered from glaucoma. Of the total 25,262 patients treated in the hospital and in the out-patient department, two and one-half per cent were recorded as glaucoma. It is probable, however, that in any out-patient department, many cases of glaucoma escape detection in the earliest stages because patients apply for the treatment of other acute conditions. This oversight obtains in the best regulated office, but is more apt to occur in out-patient services. On the other hand, it is also probable that the disease occurs less frequently in certain communities than in others. I am inclined to believe, however, that with increasing alertness to uncover the disease in its early stages, the average of six per cent will be found to be a fair average in many communities.

The operative procedures practiced for the relief of glaucoma are as numerous as the methods of extracting cataract. Some have merit and are based on sound surgical principles. Others are manifestly lacking in efficiency, largely because the surgical principles involved are not basically sound. The multiplicity of methods may be interpreted as indicative of unsatisfactory results, and an effort to develop more effective procedures, or it may be interpreted as a demand for varied technique to meet special indications. Both factors are definitely active in the development of new types of operations for the reper of glaucoma. Operators of large experience have felt that, although the broad classical iridectomy has proven its efficiency in some case, the percentage of failure warranted further study in the development of newer and better types of operations, for example, the Lagrange anterior sclerectomy, the Elliott sclero-corneal trephining operation, iridotasis, cyclodialysis, and others based on the same surgical principles. These additions have resulted in an increase in the percentage of satisfactory results. In the future the proper appraisement of the value of each form of procedure and the special adaptability of each to definite types and stages of the disease, promise an even higher percentage of successes than we have been able to obtain in the past.

A point which will bear stressing preliminary to the choosing of an operation is the following: Although each individual operator should develop and perfect his operation of choice which will yield the best results in his hands, he should be prepared to perform well the type of operation which experience teaches is indicated in a given case. The operation of choice in the first place should be one which, in the opinion of those of large experience, yields the best results. In the second place this choice must be influenced by the individual operator's ability to acquire the technique required for its correct performance. For

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example, although sclero-corneal trephining, according to statistics drawn from the literature, is of greater value than the classical iridectomy, a well performed iridectomy may offer better average results than a poorly executed trephining. It obviously is the duty of an individual operator, who has acquired good technique in iridectomies, to give his patients the benefit of his skill in selecting this operation as his by choice, until he has acquired the refinements of trephining on pigs' eyes and on eyes that are sightless or nearly so. It is equally obvious, however, that his patient should be given the benefit of the best type of operation indicated in his case, and the operator should strive to perfect his technique in the newer types of operations, if it can be shown that they offer a higher percentage of successes than that of iridectomy.

The statistics offered by Wilmer in his recent Oxford address are of much interest, even though the source of the statistics is not given. In the apparent order of their value, they are:

		Per Cent
	Cases	Successful
Iridectomy	482	63.3
Cyclodialysis	1027	66.7
Sclero-corneal trephining	3381	77.6
Anterior sclerectomy (Lagrange)	777	85.5
Iris inclusion	517	87.4
Wilmer's own cases of sclero-corneal		
trephining—		
First group	72	84.8
Second group	35	A 91.3

In the analysis of these statistics, one would naturally ask whether the cases recorded in the several series were of the same general character. Were the operators, whose cases are fine in included, equally skillful from a surgical standpoint? Were the same standards as to what should be regarded as successful applith in each series? Were the results therein recorded all properly classified as to the length of time which elapsed between the operation and the final analysis of the case? These are questions which are difficult to answer. Without this information, the true value of each microd can not accurately be obtained. It would seem, however, that in a general way iridectomy and cyclodialysis seem to be less successful than the three filtering types of operations, namely, sclero-corpusal trephining, anterior sclerectomy, and iris inclusion. A complete giversal of these statistics might be established from an equal number of other skillful surgeons, whose cases are not included in the list given above. Therein lies the fallacy of attempting to draw scientific conclusions from the standpoint of statistics. The real value of Dr. Wilmer's paper lies in his conclusions drawn from his own experience, namely, although he practiced iridectomy, anterior sclerectomy, and cyclodialysis, he practiced trephining most frequently and thand this operation applicable to a larger number of cases of glau-

coma, especially in eyes of high tension. He went a step further in suggesting that the best method of procedure is to select anterior sclerectomy for cases of moderate tension, under 35 mm. Hg., and sclero-corneal trephining for cases of tension higher than 35 mm. Hg.

If it is possible to arrive at definite conclusions as the relative value of each operation and the special adaptability of any given procedure to a special type of case, it is from personal observations of operators rather than from statistics, that proper and reliable data can be obtained.

In offering my own personal experience, statistics will not be offered, but conclusions which have been drawn during the last fourteen years from careful observation on the late results of the several types of operations which I have practiced. These results are concerned, first, with the control of the ocular tension; second, with central visual acuity; third, with the condition of the visual field; fourth, with the condition of the anterior optic segment as determined by slitlamp microscopy; fifth, with the visual comfort of the patient; and sixth, with the possibility of the operation to carry the patient through periods of depression, of sorrow, and of shock incident to accidents.

IRIDECTOMY

Previous to 1914, I practiced the classic broad iridectomy on all cases which could not be held under control by miotics. The results were far less satisfactory than the 63.3 per cent successes reported in Dr. Wilmer's gathered statistics. My lower percentage of good results may be attributed in part to poor technique, but further experience with better technique has left my estimate of the value of iridectomy unchanged. When properly performed it has definite value in a limited number of cases. In a few instances, it has carried patients through five or more years of useful vision without much change in the visual field. It is one of the operations of choice in acute glaucoma when an operation is indicated. It also probably is the best surgical procedure in glaucoma secondary to immature cataract when lens extraction is indicated in the not distant future. If the cataract is incipient and lens extraction is a remote possibility, and tering type of operation offers a better prognosis for ultimate good isual results. The serious objections to the operation are: First, its failure in too large a number of cases to control tension and preserve the visual field; second, the rapid loss of vision in some instances when the field is contracted to a small central island, or in the resence of a Bjerrum scotoma which has encroached upon the machar fibers; third, the inconvenience of excessive light pouring in the eye through a large and mutilating coloboma. The inconvenience excessive light pouring into the eye is sufficient in itself to urge the ophthalmic surgeon to develop a better type of operation. • Forth, vitreous loss and even lens expulsion in cases of high tension The only cases of lens expulsion which I have seen after glaucorna operations were those upon whom iridectomies were per-

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It is logical at this point to discuss the merits of the more modern types of iridectomies in which the operator aims to add to the original operation the principle of a filtering cicatrix. My experience with this form of iridectomy is too limited to speak at length. It carries with it the same objections as the simple iridectomy with the added hazard of a more difficult and more extended technique in which the dangers are not lessened but increased. Like iris inclusion, filtration is not obtained as satisfactorily and as permanently as in trephining. The advantage gained over simple iridectomy by better filtration is counterbalanced by the increased risk attending the operation. To these objections should be added the fact that this type of operation has not met with very general adoption.

SCLERO-CORNEAL TREPHINING

Although the average of good results from trephining was not as good as other forms of filtering operations in Dr. Wilmer's statistics, excepting in his own private cases, in my experience, the operation furnishes better results than any other type of operation. It is an operation which calls for precise technique and careful follow-up treatment for at least two weeks after its performance. One notes in the literature that operators of large experience give it first place in clinical cases because these patients are apt to become careless and do not return for observation. It gives the operator a sense of assurance that the field and tension are apt to remain under control even though the patient may fail to return for a year or more. This is my experience in private as well as in public clinic cases.

There are phases of the operation which must receive special consideration in order to obtain maximum results. First, one will rarely fail in obtaining a good thick flap if a sub-conjunctival injection of two per cent novocain is practiced at the site of the tap before the same is dissected. This insures an easy dissection of the capsule and conjunctiva. Second, the cornea should be split. It furnishes proper protection of the flap and the trephine opening is baced in the proper position, well within the anterior chamber. That, the trephine opening should be well forward in order to furnish cood and permanent drainage and such position is one of the safegual against vitreous prolapse. Fourth, the head of the trephine should be tilted forward towards the center of the cornea. A hinged attachment to the sclera is not a disadvantage, providing the corneal section is complete. Fifth, the iridectomy should be small and in the extreme periphery. The iris should be grasped immediately when it bulges forward before there is an escape of aqueous. If the recton is high, only the minutest nick should be made in the iris to allow the aqueous to escape slowly, and with the iris still held in the grip of the forceps, the iridectomy should be completed more deliberately after the aqueous has escaped. This is the second step which will prevent vitreous loss in eyes of high tension. The disc is excised after the iridectomy if it is attached above. Sixth, the most important feature of the operation, in the prevention of vitreous loss,

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is to abstain from the introduction of any instrument into the anterior chamber after the aqueous has escaped. If the aqueous escapes, and the iris sinks backs into the anterior chamber, it is conservative surgery for the average operator to abandon the iridectomy. Skillful operators may withdraw the iris after it has returned to the anterior chamber, and do no violence to the zonular fibers, but occasionally vitreous will present under these conditions. An iris repositor should never be introduced into the trephine opening, but the iris may be gently washed into place by a metal-tipped irrigator filled with one-half strength normal saline. Seventh, the conjunctival wound should be sutured by a continuous running suture. Eighth, two per cent atropine in petrolatum should be instilled before the eye is closed, and should be continued daily until all evidence of "quiet iritis" has disappeared.

The title of our paper does not admit of further reference to minute details for the successful performance of the operation. If the eight points given above are closely followed, the operation will yield a maximum of good end results.

The contra-indications are few. In acute glaucoma, an iridectomy should be given the preference. The same may be said of secondary glaucoma when extraction of an immature cataract is imminent. The one contra-indication is the present of a friable and very thin conjunctiva. Late infections average about one per cent. In my own experience the average is 0.25 per cent. Even one per cent is probably not higher than the average intraocular operation will yield. Secondary cataract occurs in some instances if posterior synechiae are allowed to form. Any intraocular operation may hasten the development of cataract in incipient cases. In this respect, trephining is no exception to the fulc. Direct trauma of the lens due to faulty technique is inexcusable.

The advantages are many. First: In my experience the highest percentage of good results are obtained by this peration. Second: There is no danger, barring accidents, of loss of the visual field or of central visual acuity. Third: A small round pupil gives the patient more comfortable vision than a mutilating broad iridectomy. Fourth: The operator has a feeling of security the central vision and the visual field will be preserved indefinitely, experiments though the patient may grow careless and cease to report. Fifth is applicable to a larger number of patients than any other form of operation.

Cyclodialysis has received much criticism pro and con. When I first approached this peration, I had the same misgivings of invading before the condition and the condition after the operation. The reaction, as a rule, is very moderate and recovery is rapid. Notwithstanding some very favorable reports, few surgeons the territory of thomasy body as Col. Elliott expressed before the

of large experience accord it a premier place as a routine operation. My own estimate of its real value at this time is in the forming. It has seemed to have definite value in holding the tension in some cases of glaucoma secondary to immature cataract, and in a limited number of cases secondary to lens extraction. In a few instances of the terminal stages of glaucoma simplex, it also seems to be of value. If the canal of Schlemm has not been closed by organic changes incident to acute inflammatory attacks, it may yield good results. It is the most painful of all glaucoma operations. It can not be said to be an operation to which we can turn with confidence as a dependable routine measure, but rather as an operation which may yield results in difficult cases in which other forms of operations are contra-indicated. For example, trephining is not satisfactory after cataract extraction. If performed at all the trephine opening must be placed in the lower part of the limbus. In this location it rarely is successful because the opening is apt to be blocked by vitreous prolapse and in addition, this location is a most favorable site to invite late infection. In this type of case, cyclodialysis may be tried. I have practiced it in a number of cases with good results. Like the next operation to be considered, it is probable that not a few operators are influenced in selecting it because the technique is comparatively simple and complications are few. It has a small but specific place in the group of operations of value in the treatment of glaucoma.

IRIS INCLUSION

In discussing this operation recently with a confrere of large surgical experience, he remarked that he thought he should try it out, but felt that he would like to try it when no one was a found. The surgical principle involved is so basically contrary to the cachings of a century that he felt he would try it out without an addience. He expressed exactly my own attitude toward the operation for a number of years. Two papers in particular which appears in the literature in the last five years, the first written by one of see surgical judgment I have always valued, lead me to feel that the operation may have some value. Both men reported excellent reachs, and one carefully classified and tabulated his cases and results. My best results were obtained in buphthalmos, possibly no better, however, than the results obtained by trephining combined with reripheral iridectomy, but sufficiently encouraging to continue to practice the operation in this type of case. It has also served me well it several instances in acute rise of tension after cataract extraction. In other types of glaucoma, my results are less encouraging. In act, in my experience, the operation is less satisfactory than a broad iridectomy. It is difficult for me to reconcile my experience with the 87.4 per cent of good results reported in 517 cases included in Or. Wilmer's report. In view of the excellent results which may be obtained by sclero-corneal trephining, I do not feel justified in continuing to any great extent the practice of this particular operation until it has been more definitely shown by a larger number of operators,

that in their hands, iris inclusion will yield as high a percentage of successes as is obtainable by trephining and anterior sclerectomy.

ANTERIOR SCLERECTOMY OF LAGRANGE

This procedure, which has been practiced by a fair number of surgeons, has much in common with sclero-corneal trephining. If the most serious objections which it shares in common with broad iridectomies could be eliminated, it probably would yield results as satisfactory as sclero-corneal trephining. The most serious objections to anterior sclerectomy are the sudden release of intra-ocular tension and the large opening made by the corneal section. Filtration seems to be fairly well established by the Lagrange operation, but it is generally conceded that trephining is safer in eyes of high tension. In balancing the objections and the efficiency of these two operations, therefore, the weight of evidence is largely in favor of trephining. In other words, I can not persuade myself to adopt anterior sclerectomy, good as it may be, when my experience teaches me that trephining is equally and even more broadly applicable, without some of the dangers which sometimes attend the former operation.

POSTERIOR SCLEROTOMY

Scleral puncture can not be said to be an operation which takes rank with the measures thus far considered, but it is so important in tiding a patient over a serious crisis, pending the performance of an operation which is more permanent in its results, that it should be included in the group under discussion. There are at least four types of glaucoma in which I have found it to be of much value. These groups are: First—Acute fulminating glaucoma which medical treatment can not control and total loss of vision is threatened. Since of these cases are too ill for the performance of an iridectomy. Lecond—Acute glaucoma secondary to cataract. Many of these patients may be tided over until a satisfactory extraction can be performed. Third—There are instances of chronic inflammatory and simple non-inflammatory glaucoma with very high tension, in which a posterior sclerotomy serves a useful purpose to reduce tension before the major operation is performed. The fourth or last group are the cases of occlusion of the central retinal vein, accompanied by increased intraocular tension. In several instances I have been able to carry eyes of this type through by means of a posterior sclerotomy. One can not restore vision, but the acute symptoms are controlled and the eyes are preserved.

PARACE SIS OF THE ANTERIOR CHAMBER

A final surgical procedure which has a limited application is that of paracentesic of the aqueous chamber. In rise of tension complicating a frank uveitis, and in acute glaucomatic attacks in which the iris becomes schously involved, repeated tapping of the anterior chamber has served in many instances to control the tension and relieve the importante danger of total visual loss. Like posterior sclerotomy, it usually serves as a preliminary measure which is followed at a suitable

time by a more enduring type of operation. In some instances, however, it serves as the only surgical measure required to bring the tension under control.

SUMMARY

To briefly summarize my results, I would give sclero-corneal trephining the premier place in the operations for glaucoma. It is applicable to a large number of patients and is the operation of choice in the greatest number of cases. Its results are most enduring.

Iridectomy is of value in acute glaucoma, and in immature cataract when complicated by secondary glaucoma.

Cyclodialysis has a limited but definite application. It fills a gap in a fair number of cases in which other methods are apt to fail. They are the cases of glaucoma secondary to a swelling lens and following lens extraction, whether the glaucoma is primary or secondary. It also is of limited value in advanced cases when vision and the visual fields are reduced to a minimum. It should also be tried when the conjunctiva is too thin to admit of a good flap. It is not a routine type of operation, but one for selected cases and not too reassuring as to results.

Anterior sclerectomy is of much value, but is attended by dangers not encountered in trephining. As Dr. Wilmer believes, if practiced, it should be upon eyes of moderate tension.

Iris inclusion should be held sub judice. In the hands of some, it is highly regarded. It will require a more general approval before it can rank with other procedures as dependable and efficient.

Posterior sclerotomy is to be recommended as a measure of much value in temporarily preserving vision and paving the way for an operation of more permanent results.

Paracentesis of the anterior chamber, like posterior sclerotomy, is a preliminary measure of great value. Its indicators differ from the latter, but in efficiency in accomplishing results, the two measures take equal rank.

In this resume of a personal experience with some of the approved methods of operating for the relief of gladdoma, many operations have been omitted, for obvious reasons. Can not expect that all of you have had exactly the same experience in your operative work. I am convinced, however, that it is that this free exchange of thought and experience that we will be able to place upon each operation its true value rather than by the conjection of statistics.

Discussion opened by Edward Jackson, Denver:

This is an unpleasant surprise. I think that the general purpose and scope of this paper is perhaps more promising than any survey that attempts to sum up the literature at the present time. My own feeling, and Lam speaking from just what I have habitually thought about glandma rather than specifically to the paper, is that our knowledge of glaucoma and, therefore, of the indications for operation and of the choice among operations is to be advanced principally at

present by a better understanding of the underlying physiology and pathology of glaucoma and the application of those effects to the watching of operative results.

Glaucoma has been a field for ophthalmic operations, recognized as a very important field, ever since Grathy first published the results of iridectomy, but in spite of that we haven't any good theory that will explain, for instance, the good results of iridectomy and will offer a philosophy of such operations as iris inclusion.

I believe, and I am not going to support this by any citations of fact, but as a summary of my belief, that glaucoma arises from a large number of conditions and causes that some of the cases are practically self-limited as regards their course, and that the foundation on which our acceptance of modern operations, or rejection, that is, our choice among modern operations as to glaucoma, is based very largely, too largely upon the results and the observation of cases that are too far advanced to be very favorably operated for glaucoma. It is on that account that I believe with Dr. Peter that trephining is perhaps the best operation from which we can expect the best results, taking glaucoma altogether, but the statistics on which trephining has been most widely supported and accepted—sometimes temporarily; other times permanently-throughout the world have been based on the class of cases that are seen most largely in India and Egypt, where trephining, I think, has proved its value and stands at the head of all other operations—cases in which the statistics show an enormous percentage (I will not attempt to give the figures) of cases of eyes that come for the surgeon to do something in Egypt, where the patient is already blind in both eyes and can only be relieved from pain. And, there is another enormous percentage in which one eye has become blind entirely and the other far advanced in glaucoma.

It seems to me that our recasting of knowledge with reference to glaucoma and the operations that give the practical interest—it is the effects of the operations for glaucoma that have given us this enormous practical interest in the subject, and that next be recast on a study of beginning cases and of the cases which have been watched (relatively few still, but I believe there will be proof from year to year) from the characteristic symptoms of glaucoma to a final recovery without operation, miotic cases and some others that have been kept under miotics.

I think I am justified perhaps in talking this way because I think it is an aspect of glaucoma which we must consider in summing up any conditions with reference of operative treatment.

Dr. W. S. Franklin, Sinta Barbara:

I feel that Dr. Peter should certainly be congratulated on his masterly presentation of the subject. Every young ophthalmologist and most of De older ones also are confronted with the question, what is the operation of choice; what shall I do with glaucoma? The literature is a voluminous and the newly made operations appear so regu-

larly that each one has a doubt in mind as to the proper procedure. Dr. Peter has analyzed the subject beautifully and has made definite recommendations—something all of us can practically tie up to.

In the neighborhood of eight or ten years ago Dr. Halder(?) and I had a series of cases of different types of visual operations which we did for the purpose of comparing the different values, and we published the results and the principal point brought out was the fact that any operation gave a relatively good result if the technic was meticulously carried out. In other words, it was a question of attention to detail which counts. You may read over the published article of some individual who has tried this or that type of operative procedure and you think and feel that you carry out his technic properly, but you overlook some detail which in itself is most essential toward the question of success, so that the point Dr. Peter made of having an operation of choice which is appropriate for the majority of cases of a given type, and then perfecting your technic in that, is of utmost value.

In the operation of corneal trephining I have used regularly the Von Hipel(?) mechanical trephine. It is somewhat spectacular. It puts your heart in your throat to some extent when that goes through. It is so quick, but I have never seen a bad result. I have attributed lack of bad results and lack of hemorrhage, following sudden lowering of the tension of the eyes, to the quickness with which this trephine goes through. I feel after treatment, following trephining, is most successful, unless a trephine is pushed and massage of the eye done, so the conjunctiva flap will not become agglutinated. Unless this is done sufficiently regularly and with a great deal of care, I think the result will defeat the purpose of trephining.

President Mellinger: I know each and every has some question in his mind, and I should like for this discussion to assume somewhat the shape of a round table discussion, asking Dr. Peter any question that you might have on your mind.

Dr. Ernest C. Wheeler, Tacoma:

I wish to add my congratulations to those of others to Dr. Peter for this paper. The question comes to my mind—what are the advantages of tages of a continuous suture it closing this flap? I quite agree with the doctor in what he has spid, but I have sometimes found that it seems to be unnecessary to place any suture at all and at other times a single suture, and I would just like to have the doctor, in closing remarks, tell us what the value of having that continuous.

Dr. Peter: Mr. Chairman, not to take any more time than necesto the selfme do see cases of that type, just as we
to answer Dr. Wheeler's question, the advantages of a contitude suture are that the conjunctival sac is closed at once; the suture
easily removed without any pain to the patient, and I have abansary, I did wan to refer to Dr. Jackson's statement as to the self-

doned interrupted sutures in conjunctival wounds of all kinds, because the continuous suture is so much more satisfactory. I draw the suture material taut and cut off the ends and the wound is sealed. Thank you very much.

President Mellinger: I am very sorry to announce that Dr. O'Connor has been unavoidably detained because of the illness of his mother, and his paper is here. It may be disposed of in one of two or three ways. One is that it may be read by title; one is read by proxy; and one, eliminated from the program. What is your pleasure?

.....: I move that it be read by title. (Seconded.)

President Mellinger: It is moved and seconded that Dr. O'Connor's paper be read by title only. Is there any discussion? All in favor signify by saying "Aye"; contrary; the motion is carried.

Secretary Hoffman: "Cataract Operations in Diabetics—Results in Sixteen Operations," by Dr. Roderick O'Connor.

The object of reading by title is to get the paper into the transactions. If a man is inexcusably absent we do not even read his paper by title, and it is entirely eliminated from the proceedings. Occasionally we have read a paper by proxy in order to get the discussion.

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CATARACT OPERATIONS IN DIABETICS

RESULTS IN SEVENTEEN

Roderick O'Connor, M.D., Oakland, Calif.

This short paper merely gives an account of my personal experience in these cases and is intended to serve as a reminder that good results are to be expected provided care is taken:

- 1. To have a careful preliminary general examination of *all* cataract cases. This will occasionally locate diabetes when unsuspected, as in two of my patients, and the risk of operating on an unprepared patient can be avoided.
 - 2. To eliminate all foci of infection if possible to do so.
- 3. To reduce urine and blood sugar to a minimum before operation. The responsibility of doing this and of deciding the proper time for operation, as regards the sugar situation, I leave to the patient's general medical advisor.
- 4. To take all possible precautions before, during and after operation to prevent infection or, in fact, any mishap. This means that the safest operation must be done and no risks taken with any other.

Of course, one must hedge in his prognosis as to visual result and it is always well to explain to patients the possible presence of retinal troubles. Because of these conditions operative results should be judged even more by mechanical conditions than in non-diabetics.

The appended table of cases gives a full statement of results with notes on mishaps and complications. It will be noted that there was only one mishap at operation and only one case of infection (due to opening of wound by rubbing eye).

TYPES OF OPERATION

1. Needling. Personally I favor this method in all patients under forty, and have used it in several over that age. Edward Jackson's paper at the A.M.A. in 1916, advocating raising the age limit for needling, induced me to try it out, with most satisfactory results. For all necessary arguments in its favor I would refer anyone interested in the subject to his paper. The handling a case this way it is most important to keep the pupil widely dilated throughout the course of absorption. The operator grust be ready to wash out the lens at once in case of hypertension. Patients must be warned of this possibility and instructed to report back at once in the event of any severe pain. At the 1924 Colorato Congress of Ophthalmology I reported thirteen cases so handled in patients between the ages of 25 and 47. Since then I have had several more. So far I have had no occasion to regret its use. The freedom from astigmatism, in itself, is worth the trouble even were there no other advantages.

Simple Extraction. For many years this was my operation of chart when the pupil could be dilated sufficiently by atropin used the

day before. A case of complete expulsion of vitreous by a patient who had given all indications of being an ideal one converted me instantly and permanently to

Combined Extraction After Preliminary Iridectomy. This, in my opinion, is the safest of all methods and, therefore, the one to be done in all cases except those in whom needling can be used. I always use an undetached conjunctival flap which, if properly made, offers but little obstruction to removal of the lens. The word removal is used purposely, as I prefer to lift the lens out with a Fisher needle, only the slight pressure required to cause the edge of the lens to appear in the wound being used. The undetached flap allows a more thorough irrigation of the anterior chamber when there is much cortical matter left behind. So far I have had no mishaps connected with discission of secondary membranes. The results are so good, visually and mechanically, that I can see no justification for any intracapsular operation. The Smith-Indian is such a "sloppy" procedure that it can hardly be considered truly surgical. The Barraquer requires too much complicated machinery which has been known to pass away at the crucial moment. Knapp's method appeals to me more than either but, in my opinion, not enough is to be gained by any intracapsular operation to warrant exposure of the vitreous even though none be lost. It cannot be denied, even by the super-operators of the Smith school, that loss of vitreous is much more frequent. Surely vitreous is one thing better in than out.

TABLE OF CASES—SEVENTEEN

Case No.	Eye	Age	Vision	Mechanical Result	Need- ling	Ext.	Con
594 Macu	R lar change		20/25 th eyes—old ret	Excellent initis.	rilo.	1	
594	L		20/25	Excellent	- (1	
1052	L	58	20/16	Excellent		1	
3450 No. 3 fraction	L 450 was n	20 noved flone.	rom Merritt Ho	Excellent ospital to the Corystal clear.	1 ounty H No retin	ospital itis.	befo
atropin a	and absent	ted her	self for six mor	Excellent n Science tende nths. On reapp embrane. A sc	earing l	ens had	ab
6571 No. 6		18 Dat	20/16	Excellent scar of a was	1 nout—th	e other	five
8129	R.S	14	20/16	Excellent	1		
8129	%),		20/16	Excellent	1		
8502\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		38	20/20	Excellent	1		

diabetic.

Vision noted w trouble. In the	as 18th da	v. Healing	had been unusi	ually rapid	and fre	ee from
3077 R	70	20/20	Excellent			1
L Left eye had r An extremely f	nild iritis a	and faint mer	Excellent mbrane . Refus	ed needling	g. No 1	1 retinitis.
3078 R	65	20/16	Excellent			1
L		20/20	Excellent			1
4039 71 20/20 Excellent						
Extensive fund worth while. He method.	us and mad	cular scars. I	Peripheral vision	n obtained	made of	peration
On 5th day he Infection. Autogo on membrane in eled." This eye v	took off nenous vacci	nask and rub ne used. Ey hs. Daughte	bed eye, opening e clear in one r later on info	month. Some	till ther cissor of hat eye	n O. K. peration "shriv-

In doing the preliminary iridectomy I make the incision in clear cornea using a narrow (4 mm.) keratome. This avoids trouble in making the conjunctival flap at the extraction. In placing the incision as stated one must use an anesthetic, such as Butyn, that does not dilate the pupil for a very obvious reason.

In conclusion, I wish to repeat that the reporting of this small series is intended merely as a reminder that there shall be no hesitation in operating on cataracts in diabetics.

College of Optometry

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FRACTURE OF THE OPTIC CANAL

Otto Barkan, M.D., and Hans Barkan, M.D. San Francisco, Calif.

Fracture of the optic canal with resultant lesion of the optic nerve would seem to be much more common than is generally supposed. Although its recognition is important to the ophthalmologist as well as to the general surgeon and its medico-legal aspect is of considerable importance, yet it receives but bare mention in the text books of today and, more often than not, remains unrecognized in practice. A review of its clinical and pathological picture would seem, therefore, not to be out of place at this time.

Since the time of Hippocrates, it has been known that blows on the frontal region often result in blindness of one eye. Because of the frequently trivial nature of the injury, various quaint theories as to its causation arose. As Callan (1) states, it remained for R. Berlin to establish on a sound basis the true pathology. At the twelfth meeting of the German ophthalmologists in Heidelberg in 1879, Berlin (2) besides reporting three of his own cases, gave an analysis of Von Holder's very carefully made autopsies in one hundred and twenty-six cases of skull fracture. Von Holder for thirty-three years filled a position corresponding to a medical coroner. In eighty-eight of the one hundred and twenty-six cases, the fracture involved the base of the skull and in eighty the orbital roof was likewise fractured, making ninety per cent. In fifty-four cases, or sixty per cent, the lesion extended into the foramen opticum. Unfortunately, these cases had no clinical data, but at the same time they established beyond doubt the frequency with which the optic canal was involved.

The present conception, well summarized by William and Saenger (3), is that reduction of vision is usually due to a fracture of the bony canal with consequent hemorrhage into the sheath or to actual laceration of the nerve within the canal or to both. In some cases, however, pressure of an anterior clinoid process may be the cause. Phelps states in six-tenths of one per cent of all fractured bases, there is a fracture of the anterior clinoid. Dr. Naffziger, a personal communication, informs me he has seen three such cases with resultant loss of vision, one of which was verified by autobay six weeks after the injury, patient having died of an infection of the jaw. Finally J. J. Evans (8) thinks that cases evidencing temporal or nasal blindness may be due to a contre-coup contusion of the nerve through it being forcibly driven against the bony boundaries of the foramen.

The sheath of the optic nerve is firmly attached to the rim of the foramen and in the extent of the canal constitutes the periosteum. Within the canal, therefore, the nerve is suspended from the periosteum by the aracthoid, there being a more intimate connection in one portion usually above and nasal. If a fracture extends through this point of

by the ar usually a

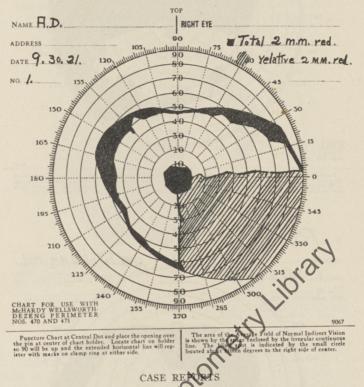
attachment, it may during its momentary dehiscense, lacerate the attachment and this tear may continue via the septa into the substance of the nerve itself. Wilbrand and Saenger also suggest that the increase of subdural pressure associated with fracture of the skull or of the optic canal would tend to force fluid into the torn nerve and thereby further increase destruction. The pathogenesis has been worked out in fatal cases which have come to autopsy and in which the clinical findings were not obtainable because of the unconscious state of the patient. It has been fairly assumed, however, that the pathological mechanism is the same in those cases of minor injury which concern us here and which we are able to observe clinically, but which by their very nature do not permit of autopsy confirmation.

As stated above, Von Holder observed in one hundred and twentysix cases that sixty per cent of all fractures of the base passed through the optic canal. This high percentage is probably due in part to the fact that four-fifths of Holder's material consisted of suicides, many of which were gunshot wounds such as are very apt to cause fractures of the orbit and anterior fossa. Brun (4) in four hundred and seventy cases of fracture of the base found only eight cases of involvement of the optic nerve (of which three were gunshot wounds). Battle (5) in one hundred and sixty-eight cases found hemorrhage into the optic sheath with reduced vision or amaurosis in eight cases. Phelps (6) states that compression of the optic nerve by orbital fragments occurred in only six cases, scarcely more than one per cent of the five hundred and seventy basal fractures.

A further review of the literature shows varying statistical figures as regards involvement of the optic nerve due to the great variation in the nature of the material and the methods of examination. It is a paradox that over twenty-two such cases were diagnosed by us in ophthalmological practice in the short space of x years. The inference would seem to be that many patients with fractures of the optic canal consult the ophthalmologist without ever being seen by a surgeon and that other cases that come secondarily to the ophthalmologist have in the absence of other signs or symptotic of fracture not been recognized by the surgeon. In either case they would not be included in the surgical statistics. In any case, the optic canal would seem to be frequently fractured and the applanation of the relative infrequency of lesion of the nerve must be due, in part at least, to the fact that the fracture so often misses that part of the nerve which is thickly attached to the periosteum and bone. It is also quite possible that a hemorrhage into the sheath of the property which is not great anough to compare the into the sheath of the occurs which is not great enough to compress the nerve sufficient to reduce vision. Indeed, in a number of our cases The control of our cases are vision, although a sector and cases of fractured base, we believe one would regard Callan states: "I am fully satisfied that the optic foramina are required in fractures of the skull, but as most of the severe

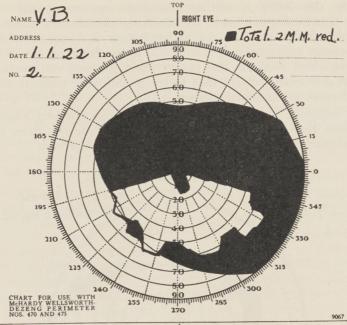
cases die, this lesion is neither looked for nor recognized. If the autopsy is not carefully made, by removing all the dura mater within the cranial cavity, and this means hard work, a fissure involving the optic foramen easily escapes attention. It has been my lot to see the four cases which comprise this paper within the past two years, which is remarkable from the fact that there are not more cases than eighty recorded cases in medical literature."

The following case reports of which we are showing visual field charts have been selected from our series of twenty-two cases because they demonstrate certain features we are calling attention to.

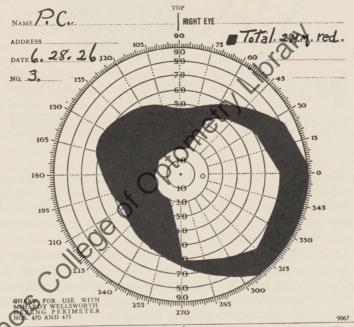


1. Mr. A. D. 9-30-21. In taking struck right side of face on root of tree. July 25, 1922. V.—R.E.—Fingers in 10 feet. Pupils equal. Direct light reaction—R. pupil—much reduced. V. Field—R.E.—outer, lower quadrant deact for red disc 2 mm., including macular region. F. Marked temporal pallor.

2. Mr. V. B. War., 1922. Fell twelve feet while working as piledriver, breaking shoulder and rib and cutting upper lid R. E. Not unconscious. When bandage was removed on fourth day noticed blindness R. E. Pevious diagnosis of optic atrophy antedating injury and not compectable. V.—R. E. Fingers in one and one-half feet. Pupils—R.F. S. mm. L.E.—4 Omm. Direct light reaction—R. pupil almost absent. Fundus—R.E.—marked temporal pallor. V. Field—



Puncture Chart at Central Dot and place the opening over the pin at center of chart holder. Locate chart on holder so 90 will be up and the extended horizontal line will register with marks on clamp ring at either side. The area of the Average Field of Normal Indirect Visions shown by the space enclosed by the irregular continuous ine. The blind spot is indicated by the small circle ocated about fifteen degrees to the right side of center.



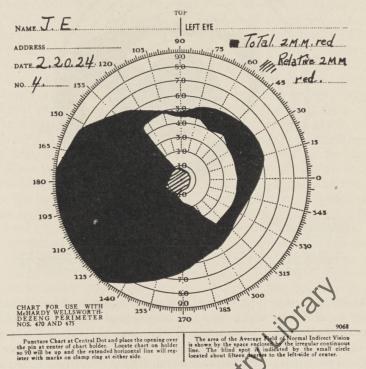
Puncture Chart at Central Dot and place the opening over the pin at center of chart holder. Locate chart on holder to 90 will be up and the extended horizontal line will regster with marks on clamp ring at either side.

The area of the Average Field of Normal Indirect Vision is shown by the space enclosed by the irregular continuous line. The blind spot is indicated by the small circle located about fifteen degrees to the right side of center.

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gradually improved from the beginning. When seen by us six weeks after the injury, this was fifty per cent better than when first observed.

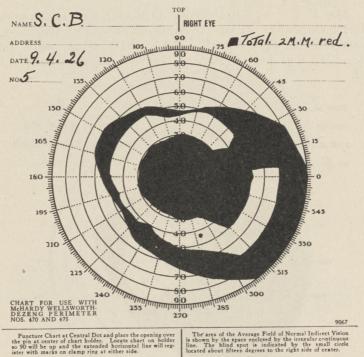
3. Mr. P. C. 5-24-26. Struck on R. temporal region with hammer during carpenters' strike. Unconscious on and off four days. Seen by us on June 28, 1926, with V.—R.E.—2/10 and no near. July 9—V.R.E.—5/10 and J III. Fundus normal. X-ray negative. Pupils normal.



4. Mr. J. E. 1-18-24. L. face and or that margin struck by falling steel structure, fracturing jaw and bruising L. E. 2-20-24, L.E. showed traumatic mydriasis due to tears of phincter, secondary glaucoma caused by subluxated lens. Tension formalized by cyclodialysis. V.—R.E.—10/10. L.E.—4/10. Field showed large defect down and out, including macular region. There were no local ocular changes to account for this.

5. Mr. S. C. B. 35-26. Struck by automobile. Unconscious three hours. Bling N.E. since then. Attending doctor noted corneal abrasion and strach of lid only. Hyperopia +4, slightly more on right than left. Visual disability had been proclaimed non-compensable by four different examiners who diagnosed the case as one of congenital and vopia associated with a high refractive error. Seen Sept. 4, 1934. V. Field showed small peripheral field defect enlarging into very extensive central scotoma. V.—R.E.—fingers excentric. L.E.—

8/10. R. Very slight pallor of disc. All findings including X-ray negative.



The history of a typical case is usually that of a bunt injury (it may be a relatively slight blow) in the region of the orbit—usually the outer portion of the superior orbital margin. A relatively slight force suffices to fracture the orbital plate because this is very thin in its posterior two-thirds. On the other hand, fractures of the maxilla result more rarely in injury to vision. Forenscally, injuries to the supraorbital region are therefore very important because the injury may seem slight in contrast to the succeeding lass of vision. The individual, if he is conscious, notices immediate loss of vision or he first notices reduction of vision upon regain consciousness or after the occasional swelling of the lids has subsided. Either the immediate—almost complete—loss of vision rapid improves, in which case the cause must have been pressure of blood within the sheath with consequent functional inhibition of the fisual impulses, or after the initial improvement of vision a permanent defect in the field remains, in which case there must have been dear in the nerve in addition to the pressure of the blood; or finally amaurosis remains as result of complete severance of the nerve. Ophthalmolomoscopically, a slight congestion of the disc has been experienced, but we have never observed this. Pallor, due to descending atrophy, may be observed from the second week on. A second defect of the visual field at the beginning may be interpreted as

a tear in the nerve and will therefore remain more or less permanent. Central acotomata may more rarely be observed. Wilbrand and Saenger state that field defects are not characteristic either in form or situation. This may be generally true, but we have found that in some cases a sector defect extending to and including the macular region is sufficiently characteristic as to be almost pathognomonic.

The condition of the pupil is of especial interest. In the early stages and where there is complete interruption of the visual impulses, the direct light reaction is absent and the pupil may be slightly dilated in semi-darkness. If the interruption is functional due to pressure of blood, the pupillary reaction returns as absorption progresses. Where the nerve is torn, however, the light reaction remains in abeyance in spite of the improvement in vision. Some of our cases demonstrate this point very clearly and the proper interpretation of this interrelation explains the clinical picture and protects one from a mistaken diagnosis. Such cases have been diagnosed as of luetic origin and antedating the injury. Theoretically the condition of the pupil is of considerable interest in that it affords further clinical proof of the localization of the pupillomotor fibres in the macular bundle. In some of our cases, we find the visual field functioning in two-thirds of its extent, vision of counting fingers, but the pupil almost immobile to light because of injury to the macular bundle. In other cases, in which there is an extensive defect of the field but the macular bundle has been spared, the pupillary reaction is normal in promptness and extent. The almost selective way in which the macular bundle has been picked out by the trauma in some of our fields would seem to show a pre-existing anatomical structure of the nerve in which the bundle runs as a separate and apparently more vulnerable structure. Any laceration, in our experience causing a sector defect in the field is therefore apt to include the macular bundle and therewith central vision and the direct light reaction of the pupil. Prognostically, this is important because if the macular bundle has been included by the tear, we can fortell that in spite of the usual initial improvement in vision and field, central vision will not be restored. Incidentally it is almost typical of these sector defects to be down and out, corresponding to the fracture above and the nasal superior attachment of the nerve.

The general surgeon attaches considerable significance to the unilateral dilation and fixation of the pupil in severe skull injuries with suspected intracranial hemoritage. Other things being equal, he would tend to localize the hemograge on the side of the dilated and fixed pupil. The question are whether the fixed pupil following fracture of the optic canal mouth not induce him to wait for subsequent dilation

not been able to find mention in the literature of any surgical pricedure for the relief of this condition having been tried. Ramsay, however, advises it. He states: "Pringle's important observation

that so many cases of traumatic amaurosis are due to hemorrhages into the sheath of the optic nerve makes the prognosis more favorable. Occasionally partial recovery of sight occurs, and that small percentage of cases ought to encourage the surgeon to advise operation at the earliest possible moment after the blindness is discovered. It is neither a difficult or a dangerous operation to open into the orbit by removing its outer wall-Kronlein-to expose the optic nerve and evacuate any blood found in its sheath; but if such operation is to have any chance of success, it must be done without delay-before compression of the blood-clot has had time to cause irreparable damage to the nerve." Dr. E. C. Sewall's6 method of approach to the apex of the orbit may prove more useful for this purpose as it is more direct, is subperiosteal throughout and is associated with less trauma than a Kronlein. In view of the possibility of an anterior clinoid process pressing upon the nerve—and this may well be the case in spite of negative X-ray findings —Dr. Naffziger has suggested to me that the best method of approach would be a subdural one as for pituitary tumor looking for a fracture of the roof of the orbit on the way. This would enable one to approach either the anterior clinoid or proceed through the roof of the orbit through the optic nerve through the foramen as the case might indicate. It will remain for the surgeon to decide which of these methods of approach may prove best to answer the purpose.

We would suggest that our colleagues be watchful for this type of case and if an early diagnosis be made, urge operation in the hope that early removal of the pressure on the nerve may restore vision in some cases in which it otherwise would be permanently lost.

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of hemorrhage and not as a matter of fracture.

Just a number which appear to pass off in a few days with rest.

Gifficulty of diagnosing fracture in the absence of any X-ray findings, I think rather great. Probably the permanency of the dam-

age done would be the more indicating factor than actual evidence of fracture itself. A great many of these cases also will show dilated pupil; sometimes temporary and sometimes entirely permanent. Under those circumstances in a case of fracture it would be called sphenoidal, the third branch of the lower nerve.

In the last ten years I don't think we have had more than two or three cases of trauma. We are not doing any industrial accident cases which are the traumatic cases and are out of practice. It would be interesting to read the paper and learn the number of cases found at autopsy. I believe Dr. Barkan said four-fifths of the cases were from gun-shot and suicidal. That would give more laceration of the tissues of the bony fissures than actual trauma of the superior orbital region. The great wing of the sphenoid is lightly protected by the temporal muscles and it would seem to me that a blow on the external orbital protuberance with attending orbital fracture would be one which would be over the upper temporal region in the thinner portion of the greater wing of the sphenoid.

My experience in these cases has been very slight and I am not really competent to discuss the matter.

Dr. Joseph L. McCool, Portland:

There are several phases of this subject which are of more or less practical importance, some of academic. In accordance with what Dr. MacLeish has said, I see very few injury cases, but I have in mind one case that brought out the point as to prognosis. It has been my feeling since seeing this case and in its study that where the onset of the blindness is sudden and complete and where the pupillary reaction to direct light is abolished, the presumption is that it is due to a fracture; whereas, on the other hand, where the diminution in vision is incomplete and rather slow in onset, we may assume that it is not necessarily a fracture, but may be a tearing of the nerve or a hemorrhage in its sheath. I think the pupillary reaction is important and I also think that we should be very careful in making that reaction to exclude the uninjured eye. I had a discussion with a general surgeon when called in, who maintained there was pupillary reaction, but he was not careful to exclude the essential reaction from the other eye.

We must not overlook the value of stereoradiography in these cases of fracture in and around the xbital canal. I am not familiar with the technic, but it is an advance over the radiography of the individual canal and I think if it is well done by a good X-ray man, it will throw some light on the actual and it these cases.

Dr. W. H. Robert Pasadena:

I would like to ask Dr. Barkan if in any of the cases of accident there has be hassociated retinal hemorrhages. I ask that for this reason that some the years ago I saw an elderly woman several days after she had struck her head violently against the top of an automobile and became immediately blind in her left eye. A few days after the acci-

dent she came into the office presenting a very typical choked disc which afterwards went on to complete optic atrophy, and at the time I saw her she was entirely blind—had even no light perception. It was impossible to prove that this was a fracture involving the nerve, but I always felt that it was a fracture of the optic canal involving the nerve, with intense choking of circulation and secondary hemorrhages.

Dr. Moore: I had a case sometime ago where the girl had complete loss of vision without light perception, with pupil entirely blind. I would like to know what Dr. Barkan makes of those cases when you have a normal fundus?

Dr. Ralph A. Fenton, Portland:

I might ask Dr. Barkan if in any of these excellently studied cases they have made the X-rays by the position of Rhese (of Neisbaden) in which the shot is made through the occipital, showing the sphenoid?

I have seen cases in which the Rhese position was the only one that would show up a fracture, or what appeared to be such a fracture, and I quite approve of Dr. McCool's suggestion of stereoradiography, but it is very difficult on account of the ethmoid shadows when taken from the front.

About the surgery of it, I might suggest that Professor Vonderive in 1925, talking about Von Frecklenhouse's disease, had some cases reported at the London Congress and he mentions that one of his colleagues attacked these fibrous growths by going in with the method mentioned by Dr. N , going in from above and coming onto the optic nerve from an above approach and they were able to preserve some vision for the patient.

Dr. Edward C. Sewall, San Francisco:

I am reading this paper before the Triotogical Society Saturday, but Dr. Barkan asked if I would mind showing some of the pictures and I am going to show them.

In regard to this procedure which is ather a radical one, I wish to say that in operating through the ethnoid mass under local anesthesia, I found I was approaching very dose to the optic canal and I felt it was feasible to even open the optic canal, and in a young girl of fourteen, one of Dr. Barkan's patients, I operated by that method without any harm to her and with some considerable benefit, removing the wall between the sphenoid and the optic nerve, but the others have been worked out in the dissecting room. How practical they are, I am not certain. The opening of the dura is a very radical step, but I cannot see it to be any more dangerous than opening the dura in a mastoid operation.

Regarding the method, Slover made a flap, raising the frontal and approached the nerve; Hilldebrand chiseled away the orbit, and opening the Gura, worked back. Danby has worked from the temporal lobe, working his way in.

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Slide—Just a few anatomical details which we will pass over quickly. This shows very nicely the relationship between the sphenoid and the optic nerve.

Slide—This shows the optic canal with our lesser wing of the sphenoid, which is frequently hollowed out by the sphenoid sinus.

Slide—The department of the orbit and the material to be removed at the side.

Slide—The same thing followed down in the orbit. This must be elevated and those muscles reattach themselves without any trouble.

Slide—In closing the work locally, we proceed in this manner.

Slide—We have had formerly considerable trouble, as they have in all frontal sinus operations of a non-obliterative type, in keeping the opening from the frontal sinus into the nose open, and we have considerable difficulty in our external ethmoid work in doing that. I have evolved a skin, bony, and mucous membrane flap which after operation I turn back and suture in place. I have only used it in two cases. In one of the cases I must say after having apparently healed, it developed an abscess, an osteomyelitis, but it seems to be quieting down. There was no reaction in the young Japanese girl. It has excellent blood supply not disturbed.

Slide—This outlines the bony part.

Slide—This shows the ethmoid artery.

Slide—Tying the ethmoidal artery.

Slide—Showing the location of these arteries which have to be taken care of. This gives practically a bloodless field if the arteries are tied off.

Slide—This leads us in the departments. Supposed to have cleared out enough of the ethmoids. This represents the sphenoid, taken down the laminary papillation between the orbit and the sphenoid. The bony wall between the sphenoid and the orbit has been removed and this shows our optice nerve extending clear into the the optic nerve can be freed on this side. The bone between the optic nerve and the sphenoid can be removed without opening the dura at all, but if the entire canal is to be freed, the whole herve is to be freed, it must be approached also from above and the see the bone covering the frontal lobe has been cut away and this dark space represents the space occupied by the lesser wing of the spheroid and we have a little sulcus covered by dura which goes back and reflects forward on the under surface of the lesser wing of the spheroid.

Slide—This is a desection showing the course of the nerve with reference to the department of the fossa.

Slide—This them a lateral view with the bony laminary papillation removed, giving the relationship between the optic nerve and the dura. This represents the surface occupied by the lesser wing of the sphenoid.

As long as we keep to the front of the nerve, there seems no reason for doing damage to structures, although we can reach almost any of

the region through this field. Any optic nerve tumor, or anything of that type, it seems it might be reached through this field.

Slide—This represents the suturing of the wound and I call your attention to the use of gauze over the mouth to keep the field clean.

The great objection that has been raised to this external operation is that of deformity and I will show that deformity is practically nil.

Dr. Walter F. Hoffman, Seattle:

It is interesting to know how much traumatism is necessary to produce these injuries of the optic nerve. I was asked recently to examine a man, in consultation with Dr. Seelye and Dr. Burns of Seattle, who had had about two years previously a very slight head injury. A month or so after this he noticed a beginning diminution of vision and when we saw him he had a marked optic atrophy on one side and a beginning optic atrophy on the other side. The X-ray picture revealed no fracture but a tremendous bony over-growth of the anterior clinoid processes. All laboratory work was negative and I suggested a neurological examination to possibly bring further light on the subject which it did not do.

The question was whether a slight traumatism could have been producing anything in the area which would have caused this tremendous bony overgrowth.

Dr. Barkan, closing the discussion:

Some of the questions Dr. MacLeish touched on in opening the discussion I think are very justified. Of course, these cases are only diagnosed as fractures of the optic canal by deduction, because they have not been proven, and practically never have been proven, none of them in the literature, but I think it is a fair assumption that that is the pathogenesis of them. The pupil may be dilated liue to a fracture in the sphenoid fissure, as Dr. MacLeish suggests. Those are things which complicate the picture, but do not belong to this particular lesion.

Answering Dr. McCool and Dr. Fenton, we have stereoradiation taken, but not in the position suggested by Dr. Fenton. Of course, we are only dealing here with cases that to not show gross lesions or gross deformities; and in answer to Dr. Koberts, in none of our cases did we see fundus changes. In the intrature, edema of the disc is reported, but we did not observe such, but in all of them some atrophy began to appear at the end of the scond week. In a few cases there were purely coincidental local injuries to the eyeball. In one of these we showed there was sublimated lens, secondary retention, relieved by cyclodialysis, but in addition to that the typical field change was in no relation at all to the ocular pathology.

I would like to thank Dr. Sewall for his demonstration.

GLAUCOMA, AN HISTORICAL REVIEW

Kaspar Pischel, M.D., San Francisco, Calif.

The name Glaucoma is derived from the Greek word glaucos: the greenish-yellowish discoloration of the dilated pupil. Hippocrates and his pupils knew this last stage of the disease. Galen says that the pain is caused by overfilling of the eyeball. It is mentioned that such patients see rings around lights. The meagerness of notes about this disease must not be taken as a proof that the ancient physicians had not made more accurate observations; only small fragments of their writings have come down to us. These have been worked up with admirable patience and accuracy by the late Professor Hirschberg of Berlin, whom many of you have met on his several trips to this country. His History¹ of Ophthalmology is indispensable for anyone who wishes to know the history of this branch of medicine. Snellen², Utrech, gave in 1891 an excellent historical essay on the development of the knowledge of Glaucoma. I will quote extensively from him. It is a most fascinating review.

The first good description of acute Glaucoma was given by St. Yves, Paris, 1722. Guerin³ of Lyons (1769) writes: "When the vitreous humor is in too great abundance the pupil is dilated to its fullest extent and has almost lost its elasticity. Such patients complain of a deep dull pain at the back of the eye which extends sometimes to the front of the head. If all the remedies for that sort of hydropsia were without success one comes to the puncture of the eye in the scleratic." This is again recommended by Mackenzie¹, Glasgow (1830).

The Prognosis in Glaucoma remained as unfavorable as it was in the year of 1841 when Sichel, formerly of Vienna, at that time the leading oculist in Paris, wrote: "Cette malade est completement incurable"—

this disease is absolutely incurable.

Desmarres declared even in 1858 Glau as incurable. The triumph of overthrowing this terrible Prognesis was reserved for Albrecht von Graefe; but for the attainment of this result a better knowledge of the morbid changes which precede the final stage was indispensable, and the way thereto was opened by H. von Helmholtz by his great discovery of the ophthalmoscope in the year of 1851.

"The results of ophthalmoscopic examinations did not at first correspond with the expectations entertained. Lens and vitreous were found to be far more transparent in the early stage of Glaucoma than had been supposed, and nothing was to be seen of the extensive choroidal changes which according to theoretical preconceptions, underlay the disorder. Edward Jaeger described and figured a peculiar change of the papilla in Glaucoma, which we now know to be an excavation, but which was degarded at that time as a globular swelling." We must keep in minut that they did not have such practical ophthalmoscopes with fine harrors as we have today.

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"Heinrich Muller made the first anatomical demonstration of the excavation of the papilla in Glaucoma."

Albrecht von Graefe about the same time discovered the venous and arterial pulse on the papilla, the latter being perceptible only when the eye is extremely hard.

Donders showed that the arterial pulse can be induced in healthy eyes also, by a gradually increasing pressure on the globe, and at the moment when the pulse appears, vision is temporarily abolished."

Bowman introduced (1862) the measures of the interocular tension -1-2-3+1+2+3 as found by the feeling of the fingertips.

Since that time many efforts have been made to measure the tension objectively, and with automatic registration. "Theoretically," writes Snellen in 1891, "the way of doing this has been determined, but in practice Bowman's method is still preferred, and rightly so, for tonometers are complicated instruments, which easily get out of order."

Since then tonometers have been so much improved that they are indispensable. Schioetz brought out his instrument about 1910. Diagnosis and treatment of Glaucoma without the use of the tonometer would by many be considered malpractice.

Von Graefe had observed that in staphylomatous eyes, which are usually hard, iridectomy was able to permanently lower the tension, and thereby to lead to a diminution of the staphyloma. As paracentesis had given only temporary relief he tried iridectomy in acute Glaucoma (1856).

His discovery that the deleterious course of the disease can be arrested by iridectomy is of priceless value.

"Although von Graefe, during fifteen years, performed iridectomy upon thousands of Glaucoma patients with the most beneficial results, he strove in vain to find the key to the myster; the cure. Shortly before his death, in his last work (1869) he reviewed his efforts up to that time, and declared himself highly satisfied with the benefits which his operation had conferred, but still quite anable to explain its mode of action."

"New observations and new facts were necessary before a new theory could be built. In the first place, certain physiological questions required an answer; the nutrition processes and the circulation of fluids in the healthy eye—how doubley take place?"

A series of physiological esearches, at the head of which stands the classical work of Leber, have established that the highly vascular ciliary body is the chief secreting organ of the eye. The freshly secreted fluid stands in close osmore relation with that which is contained within the thin membrance of the vitreous body. A slight excretion of fluid occurs at the back of the eye from the vitreous body into the lymphspaces of Schwalbe in the optic nerve. The chief stream passes over the lens and through the pupil into the anterior chamber, traverses the latter to each the angle formed by the junction of the iris and the corneal passes through the meshes of the ligamentum-pectinatum, and by

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diffusion and filtration is taken up into the plexus of the veins known as Schlemm's canal.

The influence of the nervous system on the pressure of the fluid is indirect.

The pressure of the fluid regulates the outflow, so that when the afflux is increased, a compensatory increase of the efflux occurs.

No less important were the new facts contributed by pathological anatomy. The most important point revealed by the examination of glaucomatous eyes is the adhesion of the iris-base to the periphery of the cornea.

Adolph Weber considered that the adhesion is a secondary change, induced by the pressure of the abnormally swollen ciliary body. Whence comes, then, this abnormal swelling?

It often happens that a therapeutic remedy furthers our knowledge of a morbid process. The employment of an active remedy is a physiological experiment, the effect of which must be taken into account in analyzing the nature of a disease. Thus, the fact that the tension of the eye is lessened by iridectomy must be brought into accord with the explanation of Glaucoma. And there is another remedy, the discovery of which has proved highly important both from the therapeutic and etiologic point of view.

Von Graefe himself noticed that in most cases of Glaucoma atropine does harm, because the mydriatic induces an increase of the pressure with all its evil consequences.

Lacqueur, of Strassburg, asked himself the question to what extent an action antagonistic to that of the mydriatic could be obtained by the use of a miotic? The result entirely answered the expectation: the miotic as it contracts the pupil, lowers the tension, if this be abnormally high.

These effects of mydriatics and miotics on Ghacomatous tension can be satisfactorily explained in connection with the absorption of fluid at the angle of the anterior chamber. The thickening of the iris during mydriasis promotes the closure of the filtration angle; contraction of the pupil draws the iris away from it.

According to Priestly Smith, a targe lens is a predisposing factor in the production of Glaucoma.

The question has often been raised, to what extent that strain of the accommodation tends to induce Glaucoma?

At the Seventh Interpational Congress at Heidelberg in 1888, Snellen explained how, in his publion, the influence of accommodation may take effect. "In the young eye, during accommodation for a near point, the diameter of the lens is reduced to about the same extent as that of the contracting ciliary circle. The circumlental space remains about as wide as it was before, and the zonula remains tense as before. But the conditions are quite different in advanced life, when the elasticity of the lens is lost; the ciliary circle contracts, but the form and size of the lens remain unchanged. The ciliary processes are thereby pressed

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against the lens and the zonula is slackened. This idea finds confirmation in the pathological observations of Priestly Smith:

"In such cases the ciliary processes are in close contact anteriorly with the iris, internally with the margin of the lens."

If the foregoing is correct, a timely and careful correction of refractive and accommodative errors must manifestly tend to restrain Glaucoma.

The beneficial effect of iridectomy was attributed at first to the excision of a piece of the iris. Others held that the main element was the peculiar wound in the margin of the sclera. Stellwag was the first to substitute sclerotomy for iridectomy, 1868, followed by De Wecker and Quaglino. "Should it be proved, as I think it will," writes Snellen in 1891, "that the essential part of the operation is the sclera wound, it will still be necessary in many cases to combine an iridectomy with it, because when the pressure is high the iris very easily prolapses, and is apt to check the free escape of fluid from the chamber." This could be avoided by the basal iridectomy of Hess.

"In my opinion," continues Snellen, "the effect of our Glaucoma operations depends on restoring the peri-lenticular space through the anterior ectasis of the outer coat of the eye."

Soon after Von Graefe's introduction of the iridectomy for Glaucoma, modifications sprung up.

Critchet, London (1858), and Coccius, Berlin (1859), combined iridectomy with iridencleisis. This was soon abandoned on account of the danger of irritation and infection; but a modification has lately been introduced and is practiced at the Dimmer, now Lindner Eye Clinic, in Vienna.

Hancock (1860), and later Solomon, recommended miotomia intraocularis, that is, they cut through the ciliary muscle, claiming good results. Argyl Robertson introduced (1876) trephining of the sclera at the junction of the ciliary body with the choroid.

De Vincentiis, Italy, introduced (295) the sclerotomia interna. With a special knife he cut the sclera from the iris angle outward.

Heine introduced (1905) the coodialysis.

Of the operations designed to establish drainage from the anterior chamber under the conjunctive are best known: Lagrange's sclerectomy (1906) and trephining by Freeland Fergus (1909), who combined it with cyclodialysis and Elliot's sclerocorneal trephining usually combined with iridectomy.

Harry Gradle Chicago, described at the A.M.A. meeting, 1927, a conjunctival drain of the anterior chamber.

The priority of an operation can sometimes not be established. Men in different countries may have done an operation at the same time without knowing of each other.

Wilmer⁶, Baltimore, pointed out at last year's Oxford Congress that over sixty operative procedures with many modifications are on record,

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all of which are devised solely for the purpose of reducing intraocular tension.

Based on the supposition that the hypersecretion brought on by an irritation of the sympathetic is the cause of Glaucoma, Abadie, Paris (1897) recommended the removal of the superior cervical ganglion, and Jonnesco, Bucharest, removed a larger part of the cervical sympathetic. While some good results have been reported, the dangers of the operation seem to be too great. I think it has been given up. Allard claimed (1899) good results from galvanisation of the cervical sympathetic.

Rohmer (1902) extirpated the ciliary ganglion in seven cases of absolute Glaucoma, giving relief.

Hiram Byrd⁷, continuing the experiments of Sluder, reports that cocainizing the nasal ganglion on the same side in the case of Glaucoma, gives temporary relief and advises alcohol injections.

Massage for Glaucoma was recommended by Pagenstecher in 1878. Park Lewis, Buffalo, reported at the last A.M.A. gratifying results

from the use of radial heat of the carbon filament of an electric globe in several cases of inflammatory Glaucoma.

Turning now to the treatment of Glaucoma with medicines, I find that Mackenzie, in his famous book on diseases of the eye (1830), wrote: "Dilatation of the pupil with belladonna greatly improves the vision of most glaucomatous eyes and may be employed day by day."

Von Graefe, as mentioned before, had observed the harmful influences of atropine in Glaucoma. After the investigations of Laqueur the miotics were soon generally used. Pilocarpin was first introduced in 1875, Eserin in 1876.

Wessely⁸ had in 1900, by painstaking experiments shown that suprarenin—the synthetic substitute of adrenalin—in subconjunctival injections causes mydriasis and contraction of the vessels of the ciliary body, thus diminishing the secretion from it and that it lowers the tension.

Darier, Paris, reported in 1900 in a few cases of Glaucoma beneficial influence of adrenalin drops.

Hamburger⁹ continued the experiments with subconjunctival injections of suprarenin and used it therapeutically against Glaucoma since 1923. Good results were reported by a number of men, but it had the great drawback of increasing the general blood pressure. 1925 he introduced Glaucosan for subconfunctival injections, which has the local constricting effect without to any way affecting the blood pressure. To get away from the necessity of subconjunctival injections he later introduced strong Glaucosan drops (Link's Glaucosan or Laevo Glaucosane) which do not effect the blood pressure, but have very strong local effect.

Hamburger compares the effect of glaucosan to that of an elastic bandage around extremities. The first effect is to press the blood out of the uver. This anaemia is succeeded by a strong arterial hyperemia exactly in the case of Esmarch's anaemia. "It has long been a well known and very interesting fact, that iritic or cyclitic eyes are softer

exactly known

than normal (as a rule). This is the paramount principle in the treatment of glaucoma by softening the eye. A change for the better will set in as soon as we succeed in turning the venous hypermia into an arterial one."

In former experiments he had found that touching the limbus with nitrate of silver stick caused iritis and lowered tension. This had been used at Arlts Clinic, Vienna, in the seventies.

Our own experiences with Link's Glaucosan in a small number of cases have been very encouraging. They will soon be published. I give you one example: A man 76, with one eye only, came with a tension of 40 (Schioetz). It was lowered and kept below 25 by miotics for eighteen months. Suddenly the tension rose to 32, and could not be lowered. Link's Glaucosan used three times in three weeks brought it down and kept it down below 25 the last few months.

For acute Glaucoma Hamburger has introduced Amino Glaucosan, as eyedrops, which he declares to be the strongest miotic in existence. One single drop of a two per cent to ten per cent solution will narrow a pupil previously dilated by atropine or even scopolamine or glaucosan.

Cantonnet, 1904, and Martin Fisher, about 1910, tried to influence glaucoma by the introduction of osmotic substances into the system by mouth or rectal infusion. Martin Fisher claimed softening of the hard glaucomatous eye after subconjunctival injections of sodium citrate. I

tried it conscientiously without result.

Thiel¹⁰, of the University Eye Clinic, Berlin, recently published very interesting experimental and clinical observations about the influence of-Ergotamin on the intraocular tension in Glaucoma. He points out that the physiological exchange of fluids in the interior of the eye depends on a series of factors. One of them is the sympathetic nerve. Irritation of the sympathetic nerve increases the intraocular tension paralysis (of the sympathetic), decreases the intraocular tension and the permiability of the blood vessels. (This has been proven by excision of the superior cervical ganglion.) Thiel found that ergotamin injected intravenously caused in rabbits paralysis of the sympathetic nerve ends in the iris muscle. This diminishes the permiability of the uveal vessels and decreases the intraocular tension (He is inclined to consider such Glaucoma as vasomotor neurosis. Ergotamin in the market as gynergen is either injected subculareously or taken by mouth in form of tablets.

Thiel and others report good results, especially in Glaucoma simplex and in iritis with increased tension. In Glaucoma gynergen seems to

increase the effect of piotics.

Heim¹¹, Buckrest, points out that hypersensitiveness of the sympathetic is coexistant with the lower sensitiveness of the parasympathetic and this again coincides with diminished amount of cholin in the blood. In Addiscess disease the blood contains a small amount of adrenalin, but a large amount of cholin. Blood serum from such a patient injected subcreameously reduced the tension in a case of Glaucoma, operated bathe, according to Elliott.

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Schmidt¹², Bonn, reports that in Marx drinking tests in sixteen Glaucoma patients, fifteen showed disturbance of the capillary endothelium.

Von Hofe¹³ claims that the action of the drops used for Glaucoma is only partly based on their dilating or narrowing influence of the blood vessels. They probably affect the endothelium of the blood vessels.

From these quotations you can see that a good deal of work is being done to clear up this mysterious disease. Let us hope that remedies may be found to prevent and cure glaucoma without operation. Butler at the last Oxford Congress said: "The general effect of an operation upon decrepit and elderly persons is an important factor which must not be overlooked."

I further quote Meller, Vienna: "Generally only acute inflammatory Glaucoma operations are known to give good prognosis. With all chronic cases, however, we have to be extremely careful in our prognosis. The more operations we perform the more surprises we live to see and the more we shall be careful in our predictions."

What can we do here on this coast to advance our knowledge and improve our treatment of Glaucoma? I make a plea, especially to those of you who are connected with medical schools, to consider these new remedies with an open mind-try them carefully and report to us at some future meeting.

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Discussion opened by Dr. Ralph A. Seton, Portland:

No better confirmation than this admiral paper of Dr. Pischel's can be brought for Dr. Jackson's suggestion yesterday that ophthalmology be viewed henceforth from the medical rather than the surgical view-

nt.
I shall pass by harmeresting and scholarly review of the genesis of surgical measures of glaucoma and of the subsequent development of accurate notions respecting the mechanism of surgical relief. Most inspiring is Dischel's charge to us as teachers and practitioners to consider welcone role of the sympathetic, and to try out such medicaments a set upon that powerful system. Remembering that every blood lessel carries its network of sympathetic fibrils like ivy about Sigitized by

a tree trunk, we may readily understand the swiftness with which glaucosan (and in lesser degree its isomer ephedrin) can reduce intraocular tension. Such is our own experience.

The rhinologist is turning from sphenopalatine ganglion injections and destructive surgical measures to study of tissue changes and their modifications by protein parathyroid and calcium therapy and the like. So, even with perfection in the diagnosis and operative treatment as outlined by Dr. Peter's brilliant analysis, may we not rather give earnest consideration to the counsel of Dr. Pischel? Never at the risk of irreparable delay. He has not told you that. Rather, an eager lookout for incipient tension, and its reduction along physiologic lines by the help of the sympathetic innervation. "Brethren, verily I say unto you, the man is a prophet."

Dr. Hans Barkan, San Francisco:

May I take this opportunity of pointing out, as a member of the Program and Scientific Work Committee of this Society, what a splendid idea it would be for one of the members every year to feel that he is going to give us a paper on the history of some part of our subject. I think in listening to Dr. Pischel (and I know his moods and temperament) I could feel that he had a great deal of thought and a lot of amusement in getting that subject matter, and it was of great interest to him.

I know a few years ago, when I read a paper on the history of cataracts, I had more actual benefit from the history of the subject than I did from all of my reading that year on new developments in cataracts during that year. I probably learned more

It is rather presumptious of me to point out the value of the study of the history of medicine in our own specialties, but it has a most decided one, and I feel it would be a wise idea if every year some one worked up a historical subject and with as buch credit in doing it as Dr. Pischel.

To point out one practical consequence of the study of the history of medicine, Dr. Robinson had trepfined back of ciliary body into the vitreous. I had known that for once a long while, due to the fact that I had been slightly interested in the subject of the history of medicine, and it has led me to do that on two occasions—once in a case which was absolutely hopeless and given up, I trephined through the sclera and let out some vitreons, put in conjunctival flap over and left a trephine hole in that ort of the eye, and again recently in a case going from bad to worse one eye iridectomized by Dr. Parker of Detroit in 1917; the other we lost by the same gentleman, after a trephine one or two years before that. This desperate eye was twice trephined, once in anterior chamber and once in the posterior chamber. I visited the lady and saw her able to sit up and look around, and while the eye is in miserable condition, she had six months or a year's relief, and it is a slight sign of the practical value of such work as Dr. Pischel has been

Dr. George W. Jean, Santa Barbara:

One of the things Dr. Pischel didn't mention was glucose. In this place, where we think of diabetes, we have to think something about diabetes in tension. Dr. W. D. Sansum about fifteen years ago, in Chicago, had a negro with a tension of about 80, and he nearly put him in a diabetic home when he lowered the tension to about 20.

I thought I had something new and went out and got a lot of them fed on sugar and I took the tension and then we gave them insulin, and we had some interesting changes, but afterwards I found that some German had stolen my thunder about twenty-five years ago, and I gave it up in despair.

I did see a funny thing in a woman I had done a cataract operation and she got into a diabetic home twice and was taken out after metabolic done, and she got into another hospital where they didn't understand how to take care of her, because they kept her alive for about three days. I could never get a tension in the eye in the diabetic home; never could get a reading, but I could push the cornea nearly back to the optic nerve, it was so soft.

Dr. Pischel, closing:

I can only corroborate Hans Barkan's remarks, that it is good to go over the history, and you can get a good deal out of it. For all those that introduce new measures, it is of great importance to read back, because sometimes those measures have been introduced years and years ago.

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RADIUM THERAPY IN VERNAL CATARRH *

REPORT OF SIX CASES

Frederick C. Cordes, M.D., and Warren D. Horner, M.D. San Francisco

The use of radium therapy in vernal conjunctivitis has been known for some time. The reports in the literature, however, are not numerous. A review of these in most instances is of little value due to the lack of detail of the methods employed. Important items, such as the amount of radium, whether element or emanation, screening, distance, time and details of application, have often been omitted. More careful clinical reports should be presented in order that we may arrive at a better standard to serve as a guide in the treatment of vernal conjunctivitis. In presenting these few cases we hope to stimulate more work with the detailed recording of the methods employed so that a better knowledge of radium therapy may be obtained.

One of the earliest reports of the use of radium in vernal catarrh is that of MacKenzie Davidson and Arnold Lawson¹. They successfully treated a twelve-year-old boy using 29-44 milligrams of radium applied for fifteen minutes. Seven applications were given over a period of eleven months.

Shine² reported a case in 1909 in which he used sixty milligrams of radium for five minutes. Eight treatments were given over a period of two months. In 1916 he3 used twenty milligrams for 25-35 minutes at intervals of two weeks.

Pusey4 gives his technique as used with excellent results in several cases. He everted the lids with lid forceps and passed the radium back and forth over the lid just short of the point contact. Five milligrams of radium covered with rubber dam were applied in this manner for five minute periods for six successive days. After an interval of several months this was repeated, some cases requiring four series.

Shumway⁵ used radium therapy accessfully in four cases in 1919. Fifty milligrams of radium inclosed to five millimeters of aluminum was applied directly to the exposed conjunctiva for an average of fifteen minutes at intervals of two cour weeks and in some instances three or four applications were give. This is a large dose, and most of the patients showed some skip seaction in the form of erythema of the lids and a loss of lashes, the latter, however, growing back in every instance after several months.

after several months.

Tousey⁶ in 1923 reports a dozen cases treated successfully with He used twenty-eight milligrams covered with rubber dam, and applied it to the everted lids, the time of exposure being thirty-five

minutes.

Laura Pane's first case received fifteen milligrams of radium (unscreened for ten minutes once a week for four weeks. This was repeated igitiZed by

Whom the Department of Ophthalmology, University of California Medical School.

after two months. In 1926 she⁸ reported thirteen cases treated, with good results in ten, fair in two, and no result in one.

From the above it is apparent that there is a great variance as to the dosage of radium used.

In reporting these cases we are indebted in several instances to Dr. W. S. Franklin for the use of his records.

We have been guided by the advice of Dr. L. R. Taussig, of the Department of Dermatology, as to the dosage and screening.

Case No. 1. Ernest P., age twelve, reported September, 1922, with a typical bilateral vernal catarrh of the palpebral type. Radium was applied in the form of 9.95 milligrams of radium element in the form of radium barium sulphate in a circular gold plated glazed plaque over an area of .5 square centimeters. This was screened with one-half millimeter of silver and applied over the closed lids in an application at a distance of 1.2 centimeters, the time of exposure being one hour. This was repeated twice a week to each eye for a period of two months, and then once a week for the next seven months. Following this the radium was applied every two weeks for another two months. At the end of this time the condition was cleared and there has been no recurrence since.

Case No. 2. Lionel V. D., age eleven, was referred to Dr. Franklin by Dr. A. C. Macleish, of Los Angeles, who felt the cooler climate of San Francisco would have a beneficial effect on this boy's aggravated case. Radium had been applied but was discontinued after a severe reaction. October 19, 1925, radium therapy was instituted twice a week to each eye, the dosage and method being identical with that in Case 1. The condition improved very materially the first pro months, probably in part as a result of the change in climate. Following this the improvement was very slow. We advised a stronger dosage and on April 13, 1926, applied the above plaque of radium screened only with rubber dam, directly to the everted lids for a period of one minute. April 23 the other eye was similarly treated. On June 21, 1926, the same procedure was repeated on each eye. There was no acute reaction following this type of application. The parent returned to Los Angeles the latter part of June. On September 11, 1926, Dr. Macleish writes that "the lids are decidedly better than when he went to you, but there are several nodules still present."

Case No. 3. Richard B, age thirteen, was seen May 10, 1926, with a typical vernal cataryloff a severe type of sixteen months' duration. May 10 a capillog tube 1.2 centimeters long containing one hundred millicuries of radon was applied unscreened for five seconds directly to the every lids. This was followed by a mild reaction. Two weeks later the condition showed a definite improvement. June 3 (a month after the first application) eighty-two millicuries in a capillary tube, undereened, was applied for seven seconds. The condition continued to improve and on October 2 showed only a few follicles remaining. At this time a third application of eighty millicuries was

continue remains

made in a similar manner for five seconds. December 20 the condition was entirely cleared. The patient returned February 21 for observation and showed no evidence of recurrence.

Case No. 4. Robert R., age twelve, came in June, 1927, with a bilateral vernal catarrh of two and a half years' duration. The above radium plaque of 9.95 milligrams screened with rubber dam was applied directly to the everted lids for ten seconds once a week for a month. At this time the improvement was slight and it was decided to give a larger dose. The plaque screen as above was applied for forty-five seconds. This was repeated a month later. Two months later there was no evidence of the disease and no sign of recurrence up to the present time.

Case No. 5. David M., age eleven, was seen July 5, 1927, with a bulbar vernal catarrh of two and one-half years' duration, but of a relatively mild type. A ten milligram plaque screened with rubber dam was applied directly to the lesions for a period of thirty seconds. This was repeated once a month for four months. A month later the condition was entirely cleared.

Case No. 6. Randolf S., age ten, reported March 31, 1927, with a marked bilateral vernal catarrh. The symptoms were so marked that he had been unable to attend school. He was given ten milligrams of radium (plaque) applied to the everted lids for thirty seconds and screened with rubber dam. This was done once a week for a month. At the end of this time there was a definite improvement, but still showed numerous follicles. At this time (August 3) a one and one-half centimeter capillary tube containing sixty-eight millicuties of radon was applied unscreened to the everted lids just short of contact and moved slowly back and forth over the diseased area. The time of exposure was ten seconds. There was no reaction following this and a definite improvement noted in two weeks. A month later the left eye showed no evidence of the vernal catarrh while the right eye still had a few follicles. Patient failed to return until tebruary, 1928. At this time the condition remained unchanged and another application of radium was made.

COMMENTS

All the patients treated were males between the ages of ten and thirteen. Five had the pathebral type and one the bulbar type of vernal catarrh.

In the first case shall doses were used with considerable screening and distance and che lesions, even though relatively mild in type, required eleven months to effect a cure. In the second case the radium was beneficial, although it did not produce a complete clearing of the condition. We feel that had larger unscreened doses been used (just below the eaction point) the result would probably have been better. In the third case the unscreened radon applied by direct contact produced a marked improvement, but gave a mild reaction, however, not savere enough to produce a loss of lashes. In the sixth case the dose

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was slightly larger, but the radon was applied just short of contact. This produced no reaction, but gave satisfactory results.

We feel the unscreened radium produces the best results, as it gives a maximum of the superficial rays. The one and one-half centimeter capillary tubes, because of their size, are most convenient. A dosage of six hundred to seven hundred millicurie seconds will not give a reaction if applied just short of contact and slowly moved back and forth over the lesions. To guard against the possibility of atrophy, scarring and telangiectasis an erythema dose is to be avoided.

Where an erythema has been produced, there is apt to be atrophy and the development of teleangiectasis of the skin of the lids and conjunctiva. This at times does not make its appearance until a year or more following the treatment. This applies particularly where screened radium is used as in these cases the reaction is due to the more penetrating rays.

Case No. 2, who previously had an erythema dose of unknown quantity and quality, theoretically should not have had more radium. We feel the importance of avoiding a reaction can not be over emphasized.

In view of Lane's experimental work it seems wise not to use the unscreened radium in the bulbar type, as it is prone to produce damage to the globe more readily than the screened radium. For this reason also a smaller dose seems advisable.

We agree with Pusey that "results are so gratifying in these otherwise intractable cases, and the treatment so easy" that radium therapy in vernal catarrh is worthy of wider application than it has received.

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Discussion opened by Dr. Walter S. Flanklin, Santa Barbara:

Dr. Cordes certainly has brought up a subject which, as he mentioned toward the end, should receive wider notice and application. In the ordinary difficult cases of advanced cases of vernal catarrh where you have the large payment excrescence on the upper and lower lids, practically nothing electron the application of radium seems to give any results. Surger is usually followed by perforation of excrescence, and the milder make the patient comfortable for a time. In the milder care the bulging conjunctiva attaches certain thicknesses, or atrophics on the nasal side of the cornea; wanders from pillar to post; there's itching, inability to use the eyes, and radium in these cases

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is of great value. The point that should be emphasized principally is that of dosage. As Dr. Cordes has brought out, the dosage of radium must be properly cared for and exercised. You have a remedy here so potent, which produces no pain, which produces no immediate reaction, so that an individual is liable to be over zealous in its use. We must remember that some of the after effects of radium manifest themselves as late as six months or a year in teleangiectasis of the lids, falling of eyelashes, atrophies and scarring, and if an individual pushes treatment more than proven proper by previous workings in this line, he may be confronted with just such permanent after results.

The question of screening, of course, must be taken into consideration, and we found in cases reported that those screened by the rubber dam alone, where radium is held in close contact to the cocainized eye, the best results occurred. If more people will use radium in intractable cases, and in many a case which is often diagnosed as ordinary chronic conjunctivitis, which does not get well under ordinary conditions, he will find it is a case of chronic vernal catarrh rather than conjunctivitis.

Dr. George W. Jean, Santa Barbara:

I want to cry out in the wilderness and say we might go a little easy with this. I saw a case in New York in May where the cornea was cloudy either from radium or X-ray, and I was very interested in hearing all these cases, when the doctor got down to the bulbar case. Of course, he treated that, and he was conservative in the paper.

I had a case that Dr. Franklin was good enough to refer to me from San Francisco and wanted me to use this remedy and I said, "take a trip over there and let Dr. Franklin put it on."

One of our honorable members was handling one of these remedies, either radium or X-ray, and he read a paper theore this section two or three years ago, and a man told me he was unable to operate on account of going to Japan. What is the use? They all get well. I have seen three or four of them stop the itching and in a few years are all right. The bulbar type does to sometimes to the cornea and in that case, should probably get but with radium. As to trying to take off follicles with a remedy like judium, I say no.

Dr. Cordes, closing:

I realize radium is a very potent mendicament and I don't feel it should be tried in every case of vernal catarrh, but I don't think we are justified to let a boy be kept out of school for a year or a year and a half and say the in the course of time he will be all right. In those cases where verything else has been tried, I feel we are justified in using radium although one point Dr. Jean did bring out is this, that one must do it cautiously. It isn't advisable to use radium on every case until other things have been tried.

THE DIAGNOSIS OF MOTOR PALSIES

Joseph L. McCool, M.D., Portland, Ore.

In presenting this paper I have been obliged to limit its scope to the diagnosis of motor palsies on account of the limited time allotted to each essayist.

I have no original work to offer and, consequently, have borrowed freely from the writings of Landolt, LeConte, Maddox, Jackson, Howe, Savage, Hansell and Reber and Duane; taking from each what I considered best adapted to make a difficult subject as simple as possible.

Before discussing the action of the individual ocular muscles, let me refer briefly to their anatomy, particularly in reference to their planes of action and their insertions. The internus arising in common with the other recti muscles is inserted in the sclerotic 5 mm from the limbus. It has a contact arc of 5 mm and in the primary position an imaginary plane passing through the horizontal meridian of the globe will bisect its insertion.

The externus is inserted in the sclerotic 7 mm from the limbus, has a contact arc of 13 mm and its insertion likewise is bisected by an imaginary horizontal plane.

The superior rectus is inserted in the sclerotic 8 mm from the cornea and an imaginary vertical plane will pass through the insertion slightly to the temporal side.

The inferior rectus is inserted in the sclerotic 6 mm from the cornea and the vertical plane passes slightly to the nasal side of the center of the insertion.

The superior oblique for the purpose of our sudy may be considered as arising from the pulley, it then passes as thin white glittering tendon or aponeurosis and is inserted in the upper outer quadrant of the posterior half of the globe.

The inferior oblique arises in a depression in the superior maxilla, passes beneath the inferior rectus to which it is attached by fibrous aponeurosis and is inserted in the lower quadrant of the posterior globe.

According the Landolt a vehical plane which bisects the superior

According the Landolt a vertical plane which bisects the superior and inferior recti will subtend an angle of 27 degrees with the vertical plane of the globe. A lie plane bisecting the superior and inferior oblique will subtend at angle of 51 degrees with the vertical plane of the optic axis. How has estimated this latter angle at approximately 40 degrees. The see important angles to remember, since the former represents the inject through which the eye must be rotated to place the vertical certus in the most favorable position for elevation and depression while the latter angle serves the same purpose for the oblique.

the order to more clearly understand diplopia let us next consider the action of the individual muscles as though they acted alone. The

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externus moves the eye straight out, the internus straight in. The superior rectus elevates the eye, adducts it and intorts the vertical meridian. Its elevating action in the primary position is great and this increases to its maximum when the eye is abducted 27 degrees. It probably maintains its maximum elevating action well beyond the point. Its elevating action diminished as the eye is adducted and becomes practically nil when the eye is turned well in.

It is well to remember that under certain conditions—namely after a complete tenotomy of an internus and in extreme divergent squint the superior and inferior recti act as abductors when the eye is abducted by its natural abductors beyond 27 degrees.

The inferior rectus depresses the eye, adducts it and extorts its vertical meridian. As in the case of the superior rectus its elevating action is greatest when the eye is abducted 27 degrees, and this action diminishes rapidly when the eye is markedly adducted. Its adducting and torsional action diminishes as the eye is abducted and increases as the eye is adducted.

The superior oblique's main action is that of a depressor. It abducts the eye and intorts the vertical meridian. In the primary position its depressive effect is about one-third that of the inferior rectus. Its depressing effect is greatest when the eye is adducted 51 degrees, while its torsional and adducting action in this position is nil. As the eye is abducted its torsional and abducting action increases.

The inferior oblique elevates the eye, abducts it and extorts the vertical meridian. I have observed this action when doing a tenotomy of this muscle. Before the tendon is cut if it is caught on the strabismus hook and traction made the cornea will be seen to elevate, abduct and extort. Its action as an elevator is greatest when the cornea when the torsional and abduction effect is greatest when the eye is abducted.

Having considered the action of the individual ocular muscle, let us consider their coordinate action in effecting tertain monocular movements. We are concerned primarily with the eight directions of the gaze: Straight out, straight in, up and cott, up and in, down and out, down and in, straight up and straight town.

The movement straight out is effected mainly by the external rectus, aided by the steadying action of the superior and inferior recti, which keep the eye in a horizontal plane and their opposing torsional action maintaining the vertical meridian vertical. As the externus begins to lose its effect, this is augustated by the secondary abducting effect of the obliques, which also their neutralizing effect prevent torsion.

The action straight in is effected in the same way changing, of course, from the externus to the internus and using the vertical recti as secondary adductors and the obliques as steadiers of the vertical meridian. Fixe muscles, therefore, are used in making this movement.

In morning the eye straight up the superior oblique and inferior rectus and inhibited. The motion is effected by the combined action of

In rectus

the superior rectus and inferior oblique. The lateral recti contracting steady the eye and prevent any lateral motion. Movement straight down is accomplished in the same way, but substituting the superior oblique and inferior rectus.

When the eye moves up and out the internus, the inferior rectus, and superior oblique are relaxed. The eye is carried out by the externus, the movement being opposed at first by the superior rectus and aided by the inferior oblique. As the eye goes further out and the opposing action of the superior rectus falls away the reinforcing action of the inferior oblique increases so that the outward movement is hindered only by the passive pull of the stretching internus. At the beginning of the movement the eye is carried up by both the superior rectus and inferior oblique, but soon the latter ceases to act and the superior rectus alone elevates the eye.

The vertical meridian, at first really vertical, later becomes tilted temporalward, since the increasing torsional action of the inferior oblique is now unoppposed by the superior rectus, which is acting

solely as an elevator.

It is absolutely essential that we shall have a very definite mental picture of the foregoing in order to avoid confusion. One of the greatest, if not the greatest, sources of error is to consider that the action of an individual muscle if acting by itself, which it never does, normally represents its dominant action when combined with other muscles in effecting any conjugate movement.

A single example will suffice. The right superior rectus, if acting alone, would elevate the eye, adduct it and intort the vertical meridian, yet we know that in order to bring out its dominant action—that of an elevator, the eye must first be abducted approximately degrees.

Movements up and in, down and in, down and out may be mentally constructed by changing to the suitable muscles and need not be reiterated

We see therefore that movements straight out and straight in are effected by the co-operation of five muscles; movements straight up and straight down by the co-operation of four; and oblique movements by the co-operation of three. Furthermore, it is only in movements straight up and straight down that the muscles exert a constant form of action throughout the eye's exclusion. In lateral and oblique excursions, the actions of all the muscles involved except the internal and external recti keep changing in character as the eye advances. It is owing to this fact that the two lateral and four oblique, but not the two vertical directions of the gaze, afford distinctive evidences of the nature of the trouble when any given muscle is paralyzed or overacting. Since these two lateral and four oblique directions of movement are the only ones of diagnostic importance, they are denominated the cardinal directions of the gaze.

In condering the conjugate movements of the eye from the standpoint diagrams we find that they resolve themselves into right, left, up and right, down and right, up and left and down and left. Six pairs

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of muscles are active in effecting these movements: One pair for each movement and one muscle from each eye. Therefore, to quote Maddox, the dextro ductors are the right external rectus and the left internal rectus. The laevoductors are the left external rectus and the right internal rectus. The dextral elevators are the right superior rectus and the left inferior oblique.

The laeval elevators are the left superior rectus and the right inferior oblique. The dextral depressors are the right inferior rectus and the left superior oblique and the laeval depressors are the right superior oblique and the left inferior rectus. As an example, the right

inferior rectus is a laevoductor, yet a dextral depressor.

Any study of the phenomena of monocular and binocular motion would be incomplete without at least a short reference to the visual laws which govern them. While the subject is familiar to all of you, yet Le Conte in his book on Sight, has stated them so concisely and withal so comprehensively that I shall take the liberty of quoting him.

"There are two great and fundamental laws by which all visual phenomena are explained, viz., the law of visible direction, and the law of corresponding points. The former provides that every impression on the retina reaching it by a ray line, passing through the nodal point, is referred back along the same ray line to its true place in space. Thus for every radiant point in the object there is a correspondent focal point in the retinal image; and every focal point is referred back along its ray line to its own radiant, and thus the external image (object) is reconstructed in its proper position.

The latter provides that objects are seen single only when their retinal images fall on corresponding points. If they do not fall on corresponding points, then external images are throw to different places in space and therefore are seen double.

The one gives the true position of all points in space, and therefore entirely explains the apparent anomaly of erect vision with inverted retinal images; the other gives coincidence of corresponding points in the two fields of view and, therefore, entirely explains the second anomaly of single vision with two retinal images. Both may in fact be called the laws of corresponding points. The one asserts the corresponding point for point of retinal roots and cones with external space, with ray lines connecting and crossing in the nodal point; the other asserts a correspondence point for point of the rods and cones of the two retinae, and the coincidence of their representatives in the two fields of view. From the one law flows all the phenomena of monocular, and from the other all the phenomena of binocular vision."

Furthermore, by Your of the law of visible direction and external projection we are informed with certainty in regard to the position of objects relative to each other. This constitutes objective orientation. But for perfect orientation it is further requisite that we should assign to its correct situation in space the whole mosaic of images that we project from our retina into the outside world, and which is properly constructed as far as the relation of its own parts to each other is

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concerned. In addition, however, we must have not only the conception but also the knowledge of the relationship which this bears to the position of our own body in space and of the position which the eyes occupy in our body. This is subjective orientation.

Body position is controlled by our sense of equilibrium: Eve position by muscular sensation originating in ocular muscles.

By means of subjective and objective orientation together we are able to recognize correctly the absolute position in space of any object that we see.

The time placed at my disposal will preclude any extensive discussion of the symptoms of ocular palsy. However, since the three most important diagnostic symptoms are limitation of movement, deviation and diplopia, it might be well to elaborate a little on these, since they are materially helpful in arriving at a diagnosis.

A study of the limitation of movement of the supposed paretic eye is best made by employing the excursion and comitance tests. A small electric light is best suited for this purpose. The patient is asked to follow this light with both eyes open when it is carried in the six cardinal directions of the gaze. If one eye lags we suspect the muscles into whose field of action we are carrying the light. While doing this it is well to observe the action, not only of the supposedly paretic eye, but also of its fellow. This test should be made with both eyes open and then followed with one or the other eye screened from the light, but not from our view.

Take for example suspected palsy of the right externus. When the eyes are carried to the right the right eye lags while the left eye follows the light. During this manoeuver in all probability, the left eye will fix. If, however, we screen the left eye and make the right eye fix while carrying the light into the field of action of the right externus the left eye will be seen to deviate markedly to the right as the result of secondary deviation due to over action of the left internus.

The convergence test is valuable in dischosis, particularly when we wish to differentiate between the upward and inward shoot of an eye, the result of paresis of the opposite uperior rectus and that which may be the result of a mal inserted in ernal rectus muscle. Of the former case convergence will cause no p shoot of either eye, while in the latter the eye in which the internus is inserted above the horizontal plane will deviate upwards as well as inwards.

The deviation is derimined by applying the screen test by alternately covering either eye while the patient regards a small light straight ahead and also when the light is carried in the six cardinal directions.

directions, ueviate in the direction oppoless test also secondary deviation may be detected and the prisms. The patient usually fixes with the eye not covered by the

prism. Therefore a prism placed over the paralyzed eye measures the primary and over the non-paralyzed eye the secondary deviation.

Diplopia is dependent upon the deviation and corresponds to the latter.

Paralytic deviations that produce an inward deviation are associated with homonymous diplopia, those that produce an outward deviation are associated with a crossed diplopia and those that produce vertical deviation with a vertical diplopia.

The diplopia is best plotted on the tangent screen.

In practice I believe much confusion is apt to arise in the minds of both the examiner and the patient by attempting to place too much dependence upon the tilting of the false image, and since it is possible to make a diagram of the offending muscle by means of the vertical or lateral displacement of the false image alone, with rare exceptions, it seems to me that for the sake of simplicity we may disregard it.

In outlying the field of double vision I have the patient seated thirty inches from the chart with the head resting against a head rest both for comfort and to prevent movement. Six dull black pins are placed in the screen in the six cardinal directions of the gaze at points which I have found to represent my own binocular motor field. In the diagonal directions above it measures 35 degrees, to either side 45 degrees and diagonally below 45 degrees. These figures will vary, depending upon the size of the nose, the height of its bridge and whether or not the brow is overhanging.

A nine base curve red glass is held before the right eye to aid in eliciting diplopia and to make the recognition of the double images easier.

A small electric light such as is used in the electric ophthalmoscope is placed on the black pins and already inserted in the screen. A white pin marks the false image. After the exprination is completed a chart is made and studied later.

A diagnosis of paralysis by the doubt images can then be readily and simply made by an analysis which shows in succession which group of muscle (lateral rotators, elevators or depressors) is affected; next which pair of associates in the group; and lastly, which muscle in the pair.

Thus, if we have a diplopia which is mainly lateral and which increases fast on looking to the right or left, the paralysis must affect a lateral rotation. If the diplopia increases to the right the paralysis affects a right rotator (light externus or left internus) if it increase to the left, a left rotation (left externus or right internus). If the diplopia in either case is homonymous it is the externus which is paralyzed, if the diplopia is crossed it is the internus.

If the appopia is mainly vertical and this vertical diplopia increases fast in looking up the paralysis affects an elevator. If then the vertical diplopia increases most in looking up and to the right, the muscle paralyzed must be a right hand elevator (right superior rectus or left

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inferior oblique; if it increases up and to the left, the muscle paralyzed is a left hand elevator (left superior rectus or right inferior oblique). In either case we can tell which eye and therefore which muscle is affected by remembering that the higher image belongs to the paralyzed

The rule to determine the kind of double vision produced by a given paralysis is—the image belonging to the paralyzed eye is displaced in just that direction in which the affected muscles, if intact, would natur-

ally move the eye.

If, for example, the false image relative to the true is elevated, adducted and intorted, the muscle must be an elevator, adductor and an intortor and there is only one muscle in each eye that will do this, namely—the superior rectus. Diplopiae in opposite halves of the motor field in which the false image occupies opposite sides of the true image, are independent. If the false image remains on the same side as the true, all across the field, then it is not a case of two independent diplopiae, but there is a comitant element due either to an anomaly of the converging innervation or to a consecutive deviation.

The diagnosis is complicated many times by a pre-existing esophoria or exophoria, which the paralysis makes manifest or when fixation is performed alternately by the paralyzed and sound eye. With the aid of the excursion, comitance, screen and diplopia test in all the diagnostic directions of the gaze, these cases can usually be solved. Yet Maddox truly says: "Those who have not experienced it are little aware of the difficulties that sometimes attend the analysis of multiple paralysis with much heterphoria."

Discussion opened by Dr. Dohrmann K. Pischel, San Hydrisco:

Dr. McCool has given us a very good review of the anatomy and action of the extrinsic ocular muscles. I wish to emphasize what he said about the planes of action of the recti as elevators and depressors. We cannot go wrong if we remember the anatomy of the orbits. They are in effect truncated cones, whose mesial sides are roughly parallel. Therefore they point not straight ahead but laterally. The superior and inferior recti arising from the apex to tendon around the optic canal), pass not straight forward paralled to the mesial side, but diverge to reach the center of the base of the cone, thus making an angle of about 27 degrees with the median plane of the eye.

In regard to the examination I was glad to hear that Dr. McCool believes the tilting of the false image is of little help and very confusing. As he says and difficult enough to get a patient to co-operate

to co-operate asking him to describe unagnosis, Dr. McCool tells us he employs the tangent series with pins for marking out the position of the true and false images in the various cardinal directions of gaze. The positions of the images are then transferred to a chart and studied out. To do

this we must remember the various points of the anatomy and planes of action and so on that Dr. McCool pointed out today. To many not so expert as he this is a difficult task.

I would like to mention a method developed by Prof. Hess of the Physiological Institute of the University of Zurich that simplifies all this. Hess uses a tangent curtain marked off by five degree lines with six dots to represent the six cardinal directions of gaze. From the center of the curtain is drawn a green thread. Printed charts of this curtain are furnished. To differentiate the images of the right and left eye, the patient wears a pair of glasses with one green lens through which he sees the green thread, and one red lens through which he sees the red spots. The patient sits in front of the curtain and fixes one of these spots with the eye behind the red lens, and then pulls out the green thread to that point on which the macula of the deviating eye is fixed. This is marked on the chart, and the manoeuver repeated in the other five cardinal directions. The process is repeated with the other eye fixing. Then the marks on the chart are joined together by lines making two polygons, one of which shows a defect in some area, and here we find printed the name of the affected muscle. We read it off and the diagnosis is made for us without any further study. Further advantages of this are that we do not need the co-operation of an intelligent patient, nor do we need an experienced examiner, and finally we get an accurate graphic record, which can be used for comparison when the test is repeated.

Dr. Theodore C. Lyster, Los Angeles:

In the study of ophthalmology we are often faced with the question of limitation of movement and anything which will have us along this line would probably insure better accuracy, both as far as diagnosis and further relief.

I witnessed a demonstration the other night at the General Hospital in Los Angeles of the application of the electrocardiogram to ocular movements, especially in relation onystagmus, and the demonstration brought out very clearly that the string galvanometer, practically the principle of the electrocardingram, as applied to nystagmus movements, was very accurately wisked out so that diagnosis of horizontal nystagmus was clearly shown, or the cleft was shown for the verticals, and in working out their problem, they had applied it in cases of strabismus. It is write possible that later development of this application of the electroardiogram to ocular movements might be of benefit.

Dr. Luther C. Peter, Philadelphia:

application of the subject will aid the student of this subject.

diplomed field. I would like to suggest a simpler method, because it reduces the time element very much and simplifies the procedure. In

other word. I think we have been going along the wrong lines in the recording of our diplopia fields, just as we have been going wrong in the recording of our visual fields. We study patients by confrontation method, but it is our ordinary method, really the anatomic method of study, and it seems to me we ought to make our record along the same line exactly. The simplest method of studying a diplopia field is by the confrontation method, using a small ophthalmoscope for the test object.

You study the patient from two cardinal directions, up and down; right and left, to determine the direction of the diplopia. If it is vertical diplopia, the study is made in oblique directions, up and right or up and left, to determine whether right or left hand elevates; down

and right or down and left.

In the recording of these studies a simple little chart, like a game we used to play, is the simplest method of recording. You are standing in front of the patient. Have the light in hand and have paper in hand. You draw exactly that sort of chart, always with reference to the patient's right and the patient's left, and not with reference to your own right and left, because in the interpretation of these fields, the diplopia field, if you do not use this method, you must place yourself between the patient and make the interpretation from your own right and left, and then reinterpret in terms of the patient's right and left, whereas, if you stand in front of the patient, using the chart, your diplopia field will appear logically where it should, up and right, or up and left, or down and right, or down and left, and your record is already to be placed in your files and you can make your studies.

I can assure you that if any of you will adopt this method, rather than more complicated forms of tangent screens, you will find your time will be much reduced and you will understand he diplopia field

a great deal better.

Dr. McCool, closing:

Slide—This is a picture taken from Ladolt and gives graphically the planes of insertion of the different coular muscles.

Slide—This is from Landolt, which gives a schematic arrangement

of the insertion of the planes of the muscles.

Slide-This too shows the coordinate action of the obliques and vertical recti.

Slide—This shows the planes of action of the recti and obliques and

their axis of rotation.

Slide—Scheman Aken from Landolt, which shows the distance that the cornea is decressed under the action of the superior oblique as compared to that distance which is effected by the depressing action of the inferior rectus.

Slide Othis is the Duane schematic chart with which you are familian and is the method of producing the diplopia and recording it. Digitized by Mde—Charts, self-explanatory, which I have made up schematically myself and which correspond to just about the way the results are recorded in my own work, and as they are all much as this one is, except for different positions, I won't show any more.

This little instrument is a little cap I had made to put over the tip of one of the transluminators of the Cameron instruments. This is the antral lamp and it was used because of its small calibre, and I had this little cap made that way to use as the object on one side, and if I wanted to study the tilting of the image, I had the fine streak made on the other side.

I should like to ask Dr. Peter this question, and in all of his remarks I heartily concur, and that is—in what position do you stand when you make your projection, when you are examining your patient? In other words, what method do you use? Do you use a screen such as this and make your recording as you have done there, or in what way do you stand?

Dr. Peter: I confront the patient, about a meter's distance, and pass the light in the different directions. I have my chart in hand and make my recording. If the patient indicates up and right, it is recorded in the upper right corner; and if in the upper left, it is so

any progression, if you ace of your diplopia? One of anaking consecutive examinations, ces are separated in different days.

the progress on the perimeter of the rotation may patient how far the image is separated in the separate measurements, I always determine that by rotation the perimeter.

Dr. McCool: I think it is essentiated arrive at uniformity in the recording of our results, as we are round in perimetric work.

PHOTOGRAPHY OF THE HUMAN FUNDUS OCULI

George N. Hosford, M.D., San Francisco, Calif.

From 1853, when Von Helmholz first looked at the ocular fundus of a living person, down to the present day, many ophthalmologists have felt the desire to record the pathological changes seen with an ophthalmoscope.

It was only eleven years after the invention of the ophthalmoscope that an atlas of lesions of the fundus was published which compares favorably with anything produced since that time. These plates were,

of course, drawn and painted and reproduced by lithography.

Many ophthalmologists have, no doubt, wished to photograph the fundus, and have made no serious attempt to do so, because color plays such a large part, in our judgment, of what we see in the fundus. Any black and white reproduction leaves much to be desired. It is for this reason and because color photography is necessarily a slow process, and the eye an organ that is held still with difficulty for even a small fraction of a second, that it is questionable whether photography of the fundus will ever be of very great value.

The first relatively successful attempt to photograph the fundus has been ascribed to a man named Wolff. The date of his published account is 1908, but before then he produced small pictures of the fundus about one centimeter in diameter. He did not follow up this early effort and probably the claim of priority made for Dimmer as the first man to produce useful pictures of the background of the human eye will go unchallenged. Dimmer produced his first produces at Gratz in 1906. He continued his work after he was called to Vienna and in 1927 his "Atlas of Photographic Pictures of the Human Eye Grounds" was published.

In the 1924 session of this society Dr Will Otto Bell gave an account of the Dimmer apparatus and showed the methods used and

some of the pictures.

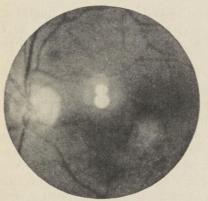
The source of light is a 220-volt of light from which the heat rays are filtered by a water filter. The chaminating system is separate from the camera system. A crescentil diaphragm is used in the train of camera lenses, so that the reflexes that are so prominent in the Nordensen pictures are eliminated. The size of the original negative is 40 millimeters and the magnification is five or six times. Most of the illustrations in the body are enlarged to about 60 millimeters. The area covered is equal to five or six disc diameters.

Nordensen, a wede, working a Upsala, described his apparatus in the Scandinavian journal Hygeia in 1915. It is a modification or adaptation of Gullstrand's Giant Ophthalmoscope. In 1925 he demonstrated to camera, built by Zeiss, to the German Ophthalmological Society at its meeting at Heidelberg. It has been available in this country for several years. It has been extensively used by Dr. A. J.

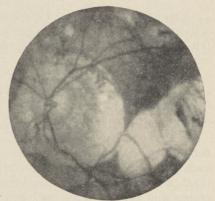
Ojdiiled by

Bedell, of Albany, New York, and by Dr. Robert Von der Heydt, of Chicago, and others.

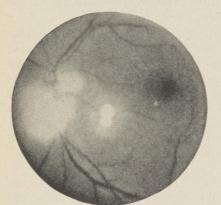
We have had our camera, at the University of California eye clinic, for several months, but only recently have we succeeded in getting it



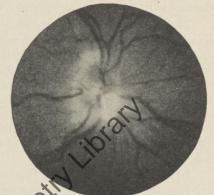
Small Tubercle near Macula Lutea



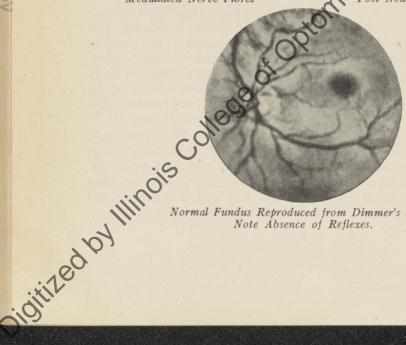
Myopic Changes About the Nerve Head. Patch of Choroidal Atrophy



Medullated Nerve Fibres



Post Neuritic Atrophy



Normal Fundus Reproduced from Dimmer's Atlas, Note Absence of Reflexes.

to work satisfactorily. We were misled by the Zeiss representative, who believed that the apparatus would work as well on alternating current as on direct. This is by no means true. The direct current arc furnishes a small brilliant area of incandescent carbon, which is essential as a source of light. Dr. A. J. Bedell, in a personal communication, wrote that he had the same experience.

The source of light is the same as the Dimmer apparatus. No water filter is used, but there is a greenish screen in the path of the rays which allows sufficient light to pass to make focusing easy. At the moment of exposure it is withdrawn and the full power of the arc light is thrown into the fundus. The maximum length of exposure is for one-eighth of a second. Specially rapid plates (up to 750 H and D) are used. No great discomfort is experienced by the patient. A headrest, such as is used with the slit-lamp, is sufficiently steady for the purpose.

The magnification is about the same as with the Dimmer camera and about the same area of the fundus is seen. As I have before intimated, the apparatus is, probably, more of a scientific curiosity than of any great clinical value. There are certain progressive lesions, particularly tumors of the choriod, or lesions that are suspected tumors, where a careful record of the size over a period of time is of value. Some other similar uses suggest themselves.

However, no less an authority than Dr. Edward Jackson, of Denver, commented favorably on the efforts to bring the photography of the fundus into more general use during a series of lectures on Physiological Optics, which he delivered recently in San Francisco.

I wish to take this opportunity to thank Dr. Domann Pischel for the use of several photographs of his cases, and Dr. Otto Barkan for the translation of Dr. Nordensen's article, which was written in Swedish.

Slide—This is the Dimmer apparatus. The source of light is at X. It is condensed, focused and introduced into the eye which is down here, through an internal reflecting prism introduced at the side. The camera plate is over at this point and the rays of light used for the camera come through the opposite of the cornea from that through which the light was introduced into the eye, and by the very clever introduction of the diaphragm in the lens, the reflexes which have been so troublesome in the Novembers apparatus are eliminated.

The light comes into the eye and through this half of the lens down in this general direction, according to the ordinary laws governing the

This is a diagram of Nordensen's original apparatus, sunlight being condensed here, reflected through the prism and into the eye;

the rays coming back from the retina through the lens and cornea are received on the projected lens and photographed here.

Slide—This is the present model of the Nordensen apparatus which has been very much simplified and made more useful in many respects. The source of light is here, focused through this train of lenses here. This is the shutter and at this point there is a screen, a greenish screen which cuts out the full intensity of the arc and enables you to look into the fundus and focus the instrument very much as you could a galvanoscope.

At the moment of the exposure this is withdrawn and the full intensity of the arc is transmitted to the eye.

The path of the light is through this prism, through this lens and into the eye. It returns through the same lens here, enters the lens of the camera at this point and comes back here. The plate is at this point. It is a reflex camera, like the Graflex type, with a mirror used for focusing, and while that is in this position the light strikes this mirror, goes through there and this is used for focusing. It is as powerful as the camera plate. At the moment of exposure, the mirror trips up out of the way and the exposure is made.

Slide—This is a case of medullated nerve fibres loaned me by Dr. Pischel. It gives you an idea of the sort of thing you can get with the camera. These two things, of course, are artefacts and are due to the reflections from that lens in the front of the apparatus, the one being from one side of the lens and the other from the other. They constitute a defect in the pictures to a certain extent, but in photographing any lesion, it is always possible to move the ye so those reflections may do no harm.

Slide—This is just a typical picture as obtained with the camera—subsiding, old optic neuritis.

Slide—This is a picture of a lesion near the macula, probably a tubercle. Diagnosis is a bit uncertain; heren't quite decided.

It is possible with this apparatus to produce stereoscopic pictures by merely taking two pictures at slightly different angles, and I have pictures of this particular case arranged in that way. The mounting is a bit faulty, so that the stereo effect is not quite as good as could be wished, but it will give you in idea of what can be obtained with the camera.

Discussion opened by A. Ray Irvine, Los Angeles:

I have had no personal experience with the work of photography of the fundus, but it has been extremely interesting. I had the pleasure about eighteen years ago of working a number of months in Professor Dimmer's chaic when he was doing a good deal of his experimental work. When a man of his type spends the time that he has spent in the wint of developing the process of photography of the fundus, we may conclude that it is well worth while and I think in the light of the

progress that has been made in the last few years, since the advent of the Gulstrand ophthalmoscope, which has enabled us from the standpoint of lumination to be more successful, I believe we can conclude that this work will find a place and that the value of having some permanent records for some eye conditions will be appreciated.

Dr. Jackson called attention sometime ago in the "Journal of Ophthalmology" to the reflections of the retina which have to be accounted for and taken into consideration in the interpretation of the pictures of the fundus, and to be familiar with the normal reflections that we get as will be recorded in all the fundus pictures, it is necessary that we are familiar with these artefacts as we find them in the plates.

Dr. Hans Barkan, San Francisco:

I think Dr. Hosford is to be very much congratulated in having shown the interest in this particular subject he has. I think it brings up several points. In San Francisco, at the University of California clinic, there are a number of young men that are busy in work there. It is easy to get a clinic of the sort where you have too many patients so you can't handle them all, but you never have a clinic with too many men on it. The thing that happens then is that the men divide the interest among themselves and one or the other gets particularly interested in some phase, and if the patient stays with him, he accumulates enough facts to have something worth while. I think Dr. Hosford has something worthwhile in the photographs, and the fact that we in San Francisco know that there is one man among the practitioners of ophthalmology who knows the theory and can do the expert work of photography of the fundus. We are to be congratulated

The matter of whether lack of color is a deficion a thing to be discussed on both sides. The atlas of Dimmer is such a magnificent work. It shows every conceivable phase of the fundus by pictures that range over three or four years for the same division and shows the photographic work of regression of disease. It is particularly interesting to look at things and the lesions are striking and almost make one feel that they are lesions that one sets themselves, much more than the colored plates.

The other great advantage whe matter of teaching with plates of that sort. I think it will impress students quite a bit more clinically if they are shown photographs of the same fundus in different stages of disease than if only stown one colored plate of one stage, because that is what the color plates are, and they are never as accurate as photographs taken a various times of the same disease.

menced somewhat with it. After I had been experimenting for a while, trying to get photographs of the fundus, I found that before me, Dr.

Henry D. Noyes particularly, had worked on the same problems. The difficulty, of course, is the lumination and particularly getting enough light back from the fundus, colored as it is, to affect the photographic plate and the great achievement of Dimmer was that he showed the possibilities of the process.

Now I am sure that there will be rather wide practice with the camera. The camera is perhaps still capable of improvement, but it is a camera practical for men who are not expert photographers. Dr. F , who has been associated with me, got one of the cameras a few months ago, and he has taken some very good pictures with it. I have seen the patients, and I have seen the pictures afterwards, and I am sure that the belief that it is of great value in clinical work is well founded.

The pictures, as they come originally, in original size, without enlargement, are small enough to be used close together so that you can get a spectroscopic effect without the spectroscope. It makes it possible to print them on a page of a journal article or a book and to look at them, if you have not become expert without the necessity of having convex lenses. You can put a pair of convex lenses in a trial frame and stick them in front of the glasses and get the stereoscopic effect from two of these pictures that are placed as close together as they can well be put. When that is done this reflection from the lens which appears in all the Nordensen pictures, the double reflection, one from the anterior surface and one from the posterior surface of the lens, ceases to be a drawback or defect in the picture. It is very evident that those reflections are really situated, the light is focused clear in front of the retina and besides shifting them over by shifting the direction of the eye before the camera, you can generally see that the reflection is out in the vitreous in front and there are the fundus lesions that you can see back. It gives the sense of depth on the pictures that we look at that has never been gained before for pictures of the fundus, except in the stereoscopic plates of Oatman. There you can get a good deal of that effect and really it is interesting to know that Oatman worked by making his picture of the thidus that he was going to photograph stereoscopically, in a great hig bowl, and the concave surface of the bowl, working in the strictures that he wanted to show, then photographed it just as you take any other picture for a stereoscope. That was the method that made his plates better for teaching from than any other representations of the fundus that have been produced, and I think that the pictures taken with the Nordensen camera (and they can be taken from any clinical case of fundus disease, and taken for stereoscopic examination, binocular examination, so you get the binocular effect), when have a very great value in teaching fundus lesions.

Dr. Peter: I would like to add my testimony to the practicability and scientific value of this camera. We worked with the direct current, as the escapist pointed out, or with the converter with A.C. current, and it requires very little time, from three to five minutes; requires no special knowledge of photography; the focusing is simple and it is

special control of the special control of the

simply a matter of turning the light at the proper moment and your photograph is taken, and you refer these pictures to a photographer to have them developed. We are in the habit of enlarging them for demonstration purposes. That also is quite a simple system. That is for class work and for Society presentations, and you have the advantage, if you wish to, to have your photograph colored with accuracy. You know the average artist is artistic and not accurate or scientific, and he likes to work into the picture something artistic rather than accurate, and with these enlargements, you can have the artist color the fundus and your proportions are well preserved.

Another phase of it, of course, is the matter of record referred to. It is exceedingly interesting to see the progress of a case. With the photographs you can see the development of an intraocular condition. Another source of satisfaction is to be able to show the patient that their lesions are growing less marked.

Dr. Hosford, closing:

Dr. Jackson in his remarks has forced me to confess that, as many of you have observed, through the stereoscope they are not quite perfect. The difficulty is in the fact that in mounting them and in making the enlargements there has been an inversion, so that these reflexes do not appear where they should exactly. However, you can get an idea of the stereoscopic effect.

Mention has been made of the reflexes. I brought along a picture showing a few reflexes. These things come out in young subjects particularly. That might look like almost anything, but a perfectly normal fundus with the light reflected from the various planes of the retina. The technic, as Dr. Peter has said, is not so difficult. Aper you once Olditled by Illinois College of Optometry get the machine working, in a few minutes, with a well dilated pupil, you can make several exposures and it is really very little additional

FRIDAY MORNING SESSION

April 20, 1928

President Mellinger: The meeting will please come to order. The apparatus is not ready for the first speaker, so we will change the order somewhat and the first paper will be "Submucous Resection in Children," by Dr. R. E. Windham, Longview, Wash.

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SUBMUCOUS RESECTION IN CHILDREN

R. E. Windham, M.D., Longview, Wash.

The subject of submucous resection is such a large one and of such importance that volumes could be written in considering it from all aspects, but as the title of this paper implies, I shall try and only hit the high spots from a practical standpoint without much volume.

The submucous resection is an accepted surgical procedure of great importance in the relief and prevention of a chain of symptoms and conditions. There is a wide variance of opinion as to the age limits for the submucous resection especially as applied to children. There are some differences on the upper age limit, but the debatable question is the lower age. There are many good men advocating strict adherence to the lower age limit, while others advise an utter disregard of the age. The operation on adults is but a comparatively few years' standing, and on children, it may be considered very recent and still unaccepted by many prominent men.

The operation and its indication should be considered from a mechanical, pathological and physiological standpoint, both present and future and unless done so there will be many failures.

Let us look for a moment to the physiology and function of the nose. The basic physiological functions are:

- 1. Olfactory, or sense of smell.
- 2. Phonation, to resonate the voice and speech.
- 3. Respiratory, to aerate the lungs.
- 4. Gustatory, to assist and modify taste.
- 5. Ventilator, to patilate the sinuses.

The two main structures of the nose are the septum and inferior turbinate, from a whictional standpoint, the inferior turbinate playing the major physological role. It is the main warmer, humidifier and filterer of inspired air.

The stell bodies or erectile tissue of the nose and the serum secreting glands of the mucous membrane of the nose so warms, moistens and filter the air that when it reaches the air vesicles where this function is much less, the lungs and tissues are not traumatized or damaged,

but with a deflected septum and blocked nasal condition the lungs are not so protected, consequently undergo a physio-pathological change, thus markedly altering the development and vitality of these growing youngsters.

It is estimated that in a normal functioning nose one pint of serum is transferred from the nasal cavities to the lower respiratory tract in each twenty-four hours. In an obstructed nose this is greatly decreased, thus upsetting the physiology of the lungs, and we also have compensatory atrophy and compensatory hypertrophy in areas of the nasal mucous membrane.

The vast majority of these nasal obstructions being in children and young adults, then why should not the majority of submucous resections be in children and young adults? When treatment fails and surgery indicated, this should be accomplished with greatest respect to the location of the swell bodies and important physiological areas.

The classification of septal deflections may be considered:

- 1. Cartilaginous deviations of the anterior end of the septum, angular or perpendicular, which may obstruct respiration, block drainage, alter the physiology and greatly affect the accessory nasal sinuses.
- 2. Osseous deviation, under which we may have:

(a) A ridge, crest, knee, a spur, or knob or one reaching the entire septal length above the Cresta Nasalis on the Vomer encroaching on the inferior turbinate, thus causing irritation and altered physiology of this important organ, plus a lateral deviation of the septum to the opposite side obstructing the upper quadrant of the nose.

(b) The perpendicular plate of the Ethmoid thone which impinges on the middle to the Ethmoid thone which impinges on the middle to the Ethmoid thone which impinges on the middle to the Ethmoid thought the middle to the Ethmoid thought the middle to the Ethmoid thought the Ethmoid thought the middle to the Ethmoid thought the Ethmoid the Ethmoid thought the Ethmoid the Ethmoid thought the Ethmoid thought the Ethmoid the Ethmoid thought the Eth pinges on the middle turbinates and the in turn on the lateral walls of the nose, thus greatly aftering the physiology and function of the nose plus blocking of ventilation and drainage of the frontals, anticopy sphenoids and ethmoids. The function of this part of the hose practically ceases and is followed by a catarrhal and suppurative inflammation of the nose and accessory muses. Here the sinuses are changed to a negative pressure, function and circulation changed and with the presence of pus organisms as staphylococci, streptococci and pneumococci we have a suppurative sinusitis or can-sinusitis.

This may be considered one of the worst and most dangerous types of septal deflections.

This type may be well considered may of these septa are perfectly straight and free deflections, but extremely thick, causing all the conditions as mentioned above, and are just as urgently in need of surgical intervention.

- (d) Combined deflections, that is a succession of waves or deflections in various areas of the septum.
- (e) Spurs of osseous septum.

What are the complications and sequels of septal deflections and obstructed noses.

- 1. Acute Rhinitis and repeated coryzas.
- 2. Acute sinusitis, catarrhal and suppurative.
- Chronic Hypertrophic Rhinitis.
- Chronic Hyperplastic Rhinitis.
- 5. Chronic turgescent Rhinitis.
- 6. Chronic Polypoid degeneration of the nose and sinuses.
- Atrophic Rhinitis and ozena. 7.
- Chronic sinusitis, catarrhal and suppurative. 8.
- 9. Otitis media, catarrhal and suppurative.
- Catarrhal deafness. 10.
- 11. Mental apathy and mouth breathers.
- 12. Maldevelopment of the facies and so-called nervousness.
- Thin, undernourished patients with low vitality and poor resistance, thus making them easy prey to other diseases with markedly increased ill-effects of the disease.
- Asthma and Hay Fever. 14.
- Snoring and choking while asleep. 15.
- Asthenopia of ciliary and extra ocular muscles. 16.
- Brow-ache or headache over frontal region to the occiput (by pressure on the sensory part of the trigoninus).
- Lack of focusing power of the ciliary miscle and premature 18. presbyopia.
- Dizziness and vertigo.

The indications for a submucous reaction may be stated here, as being for the prevention of the above camed complications of a blocked nose without repeating them.

The cause of septal deflections is still a muchly mooted question. In the developmental sense, Tilbot's explanation seems the most accepted, namely, he believes that malformations of the nasal septa are due to neuroses or stigma of degeneracy and comes under the same neurotic influence as picton chest and adenoids, and that these neuroses cause either an arrest of an over-development of the bones of the face, including deformations. including deformed septa.

Exciting or extra nasal causes may be given as:

Age; 3. Sex; 4. Climate; constitutional diseases which lower metabolism especially affecting tissu and predispose them to inflammations. 1. Traoma; 2. Age; 3. Sex; 4. Climate; 5. Exposure; 6. Clothing; Constitutional diseases which lower the resistance and upset The metabolism especially affecting tissues of the respiratory tract The intra nasal causes may be listed as follows:

- 1. The valve or bellows type of nose, which causes uneven pressure within the cavity.
- 2. Large obstructing inferior turbinates which blocks the lower part of the nose, causing uneven pressure and abnormal development in upper nose.
- 3. Abnormally large and obstructing middle turbinate unilateral or bilateral, exciting uneven pressure within the upper quadrant.
- 4. Large prominent bulla ethmoidalis occluding the infundibulum and blocking ventilation and drainage.

The symptoms of obstructive septal deviations may be briefly stated as follows:

- 1. Sense of stuffiness and fullness of nose and pressure over the bridge.
- 2. Dizziness and vertigo, exaggerated on changing the body positions and jarring body.
- 3. Frontal headache prevalent on arising.
- 4. Change in character and quantity of nasal secretions.
- 5. Reflex asthma and hay fever.
- 6. Intermittent nasal stenosis.
- 7. Post nasal dropping into epipharynx.
- 8. Intermittent stenosis alternating from side to side.
- 9. Hemorrhage or epistaxis.

The only contra indications to a submucous resection in children thus far presented is a possible chronologic change in the physique of the nose.

With the extreme rarity of this development and with plastic surgery at its height of perfection, how much better off a patient is with a depression on the dorsum of the nose that to have one or more of the above named complications which bright handicap it the remainder of its life.

Since the vast majority of septal deflections and obstructions are in children and young adults and the party of complications or ill-effects, why should we not recognize the physiopathological law, namely, when the drainage and ventilation of mucous membrane lined cavity is impaired or blocked, the conditions are favorable for the growth of pathogenic bacteria, and to more submucous resections in children, thus relieving them of these serious handicaps.

When do we give friut tree the best care for its future value? The first few years of its existence.

When do we give a pig or a calf its best care for a future animal, namely its early days. Then why should we not relieve a child in its early years of all the handicaps possible, thus giving it its best chance in life.

Would a surgeon hesitate or fail to drain circumscribed pus on account of age? With manifest pus in a mastoid do we hesitate on account of age? The answer is NO. Then why should a child be compelled to struggle for ten years or longer with a definite physical handicap because it is only five to ten years of age.

Killian as early as 1908 stated that for a number of years he was opposed to the submucous resection in children under twelve years of age, and had invariably advised postponement of operation for a few years, but now recommends to operate early. Loeb did not advise operation before the seventh or eighth year. Hayton in 1916 published the results of submucous resections in children at the Royal Infirmary, Edinburgh, numbering seventy-three cases performed by Drs. Logan, Turner and J. S. Fraser. A quotation from this article states: "The advisability of performing a submucous resection upon a nasal septum before the age of puberty, while not contested as keenly as a few years ago, is still a debatable question."

Orendorff states that he has not operated upon patients under ten

vears of age.

Carter feels that one of the most important factors, if not the most important, to be considered when a submucous resection of the nasal septum is to be performed or not, is the age of the patient. His experience is that extensive destruction of the nasal septum, as in a complete resection in children, eventually results in deformity of the nose, such as broadening of its base or flattening of the bridge or dipping from above downward, especially at the ends of the nasal bones, but recognizes the ill effects of nasal obstruction and advised relieving the obstruction and with as little trauma as possible.

Alexander expresses no fear or ill effects following the operation in young children and claims it is of great advantage, his experience and observation covering several years. When indicated, he fully removed cartilage and bone in undeveloped noses and does not advise makeshift operations for the removal of obstructions but tackles the septum itself.

Brown does not advise the submutus resection, except under very special circumstances, in a patient under sixteen years of age.

Yearsley thinks the prejudict against doing a submucous resection before puberty is unjustifiable.

Weinberger believes in waiting until facial development are about

complete before operating

The differences of opinion are not indications or contra-indications, but the lower age that, the upper age is not such a mooted question, although some those believe in operating in cases past fifty years.

How often to we have one of these youngsters brought in with the history that the tonsils and adenoids have been removed, one, two or five years with no relief to the patient, but on the contrary the symptoms congerated and the patient gradually going from bad to worse.

but true, these tonsillectomies and adenoidectomies are not that to having been done by a general man, but many are done by

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specialists of considerable repute, leaving the patient to suffer from the major malady because he is not fifteen or eighteen years of age.

The writer does not believe there is sinus trouble in every case of nasal septal deflection, but does believe the great majority of sinus cases are associated with a septal deflection of one character or other.

The writer's experience in submucous resection in children has been over the last six years. The youngest case being not quite seven years, the average being a bit over nine years.

In not one instance has a disproportionate growth between the nose and other parts of the face been noted. The results have been uniformly good, improvements very pronounced and in many cases nothing short of marvels have been obtained in improvement.

The causes of septal deflection as to their embryology, etc., has been purposely omitted, these being well understood by all.

The writer has had three cases in the last year who had had tonsils and adenoids removed without results, the parents having lived in two or three different states with hope of getting climatic relief, but failed. These were operated with complete relief of pre-existing symptoms, their ages being eight, nine and thirteen years.

These youngsters come in with various complaints and pathological findings, some with a plain uncomplicated septal deflection, some with tonsils and adenoids with septal deflection, some associated with sinus infection, single or multiple sinuses involved, and some with adenoids regrown plus the septal deflection. The case histories herein given are of rather extreme type, associated with absolutely no other pathology.

In attacking this procedure and surgery, we must be physicians and be able to view our patients from every angle and not money from the standpoint of a specialist.

We must not make the error of considering the condition simply as a departure from the normal without inquiring into the conditions that produce the departure. In other words, many, observers simply record the fact that the patient shows this or that without determining the relation it bears to some other important physiological function. The importance of determining these points must be signalized if we hope to arrive at a correct diagnosis and progressis of our patients.

The deviation found may be but a symptom and to treat it as a substantive affection without determining the conditions that underlie it, or the disturbances that it may cause, would seem as strange a thing as for a physician these day to treat a case of dropsy simply as dropsy without seeking for its cause, or considering the physiological disturbances in other body waters.

THE OPERATION

Some advocate only a high resection, some only a low resection, but it is the writer's opinion that the operator should do all at the initial operation that will likely to ever need be done, as a secondary operation on the hazal septum is next to impossible, especially for a neat job.

The operative technique is that of an adult case except all are done under general anaesthetic aided by a Eustachian Catheter as a nasal suction, all cases done in a hospital. All cases getting a complete submucous resection, except that, as large a piece of cartilage is left anteriorly as possible, together with as deep a band as possible back to the attachment with the nasal bones. All cases are packed with vaselined gauze after drainage openings are made in the flaps and the anterior incision sutured. Patients are kept in upright or semi-reclining position for twenty-four house, the packs removed at the end of twentyfour hours and the nose cleaned and dressed at end of the third day.

In summing up, I may say:

- 1. The number of children needing submucous resection seems increasing.
- 2. There is no denying the ill effects of an obstructed nose left alone, nor the good effects of a submucous resection properly done in a child.
- 3. The time is at hand when we must lay aside our bias or prejudice to performing a submucous resection in children regardless
- 4. The man who does not do submucous resections in children may well consider himself as missing a very important issue, and failing to give his patient the service which he is entitled to.

The following are a few typical case histories, uncomplicated:

CASE 1. Jackie D., male, age nine years. Referred to me November 23, 1925, by a general man after he had given him a complete physical examination with negative findings.

The special history was that his tonsils and alenoids were removed

at age of five years.

Nasal breathing, difficult, to almost complete obstruction, a lot of head colds of long duration, complete this of former pep and playfulness, indifferent to his studies and things in general, and a gradual failure in his school work, and morth by month receiving poorer grades.

He was wearing glasses Occ. 250 Sp. =100 Ex. 90, which were found correct on re-refraction.

found correct on re-refraction

His nose showed a badly deflected septum, both to right and left, blocking nose; all turbinales were turgescent.

On December 26 1925, a complete submucous resection was done

Six months after operation he had fully regained all his lost pep and ambition, took a great interest in everything. Very studious and at top Wery studious and at top and nasal breathing, free of headaches.

Still normal in every respect.

Referred to me on a general man after a complete physical examina-

tion with negative findings, with a history of Bronchial Asthma and frequent head colds and difficult nasal breathing.

Special history, tonsils and adenoids out in October, 1924, with marked general improvement. Always a great many head colds and several attacks of abscessed ears in past. Over the last year before seeing him, he had been having attacks of asthma, lasting several days to a week or more, having to sit in a chair by an open window for sleep.

Examination showed a deflected septum, also a very thick septum, together with large middle turbinates, causing a marked upper nasal blocking. Tonsils and adenoids out and nothing else abnormal found.

On February 1, 1927, a complete submucous resection was done, and both middle turbinates removed. He did not have any asthma during post operative convalescence, and has had none to date, one year later. His general condition is much improved, has free nasal breathing and has been practically free from head colds.

Case 3. Margaret S., female, age thirteen years. Came to me directly on May 14, 1926. Special history, tonsils and adenoids out at age of eight years, with no relief and a gradual exaggeration of her

symptoms.

Had always been a mouth breather, never being able to breathe through her nose. She was somewhat apathetic looking, melancholic and a very poor student in school. Her teeth were prominent, face sharp and pointed, bearing evidence of a nasal obstruction. Somewhat pigeon chested and poor general physical development.

Her parents had moved from Colorado to Southern California and from California to Washington, with the hope that her health would be

better.

A requested general examination revealed nothing.

Her special examination was negative throughout except retracted ear drums and a badly blocked nose, due to a badly deflected septum and very large inferior turbinates, their edges pressing on the floor of the nose.

This girl was always tired and pepeers and was nervous and had a great many colds of long duration, in fact, seldom without an apparent cold, and sneezed a great deal of time.

On May 17, 1926, a complete submucous resection was done and the inferior turbinates shortened in the floor of the nose.

Since operation she has grown and seems like a different girl entirely, always smiling in cheerful, gained considerable weight and development, constant ee nasal breathing and now hardly knows what a cold is and seems to have taken an entirely new hold on life, being entirely free of all pre-operative symptoms, and her parents state that since the operation is the only well period she has had since infancy.

Just hittle bit as far as operative technic. The submucous resection in children is the same as in adults. I first inject with a solution

E SHIPPARD WEW LIBRA

of adrenalin in proportion of twelve drops to the ounce, to prevent hemorrhage along the line of incision. I elevate the mucous membrane as in adults, going back about an eighth of an inch before I cut the cartilage. That has two advantages. In children the tissues are thin and hard to handle, easily torn. That prevents laceration and the possibility of perforation at the line of incision. I do it from there back as in adults except to leave as large a post anteriorly as possible; leave as large a band back to the nasal bones as I possibly can. Going beyond the attachment with this upper incision, I do this in order to take extra precaution of not disturbing the attachment of the cartilage to the septum, to prevent possibility of future deformity. Then I do a complete resection as in adults.

In order to get the dropping and flattening of the bridge of the nose, we consider the nasal bones which are quite heavy and thick, extending quite widely on the side of the nose. The septum in children is quite thin and quite weak, and I don't think by removal of the septum and the little possibility it adds to the support of the nose is going to cause the heaviness of the bones to give away and have a dropping of the nose. In order to get that you must have one of two things—a dropping of the nasal bones into the nasal cavity in this manner, or they must bulge out. I don't think there is any difference in relation between the support the septum produces in children than the relation in adults. We have just as much possibility of dropping of the nose in adults as you do in children.

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Discussion opened by Dr. Edward C. Sewall, San Francisco:

It is a pleasure to discuss a paper where the opinion of the author has been so frankly and clearly stated. I must give Dr. Windham credit for aving the courage of his convictions. I do not agree altogether with the indictment that he has brought against the deflected ajojti Zed by septim as a whole. I presume, however, that he does not attribute the chain of complications to all deflected septa. He has in mind certain bad effects that may occur with certain bad septa. We have all seen badly deflected septa with hardly a symptom of pathology. The meat of the discussion, however, centers about the age at which a submucous resection is advisable.

I have always been adverse to operating in the young. However, the age of the patient has never interfered with my determination to operate where the pathology demanded it. Also, in operating in the young, I have decidedly curtailed the amount of the upper cartilaginous part removed. I have seen no bad effects from any of the operations that I have performed in that way. I have had one or two slight depressions in young adults.

My aim has been to relieve the nasal obstruction with as little sacrifice of septum as possible. I do not feel that an operation in a young child, properly done, that heals normally, complicates seriously a re-

operation later.

I have come to this meeting for what I can learn from my colleagues, and again I say that the paper presents clearly and frankly an issue, and we learn from the men who take up an issue and deal thoughtfully with it. If I am convinced from the work of others that such operations in young children are harmless, I am glad to follow. I must say I have not seen the necessity for operating in children very frequently in many years of practice.

I would say one thing about the depression of the nose about which the doctor has spoken. I don't think it is the depression of the bones of the nose that we fear. The nasal bones are rarely depressed from any septal operation, aside from some bad abscess. It is a depression always, I think, of the soft parts, but I congratulate had again on coming forth with this contribution, the fact that he has done this work and brings it before us to discuss it frankly.

Dr. Hayward G. Thomas, Oakland:

The danger of a man bringing out something new is that he is accused at once of operating on every darked septum as long as there is deflection, and the writer of that paper did not say that. He operates where there is pathology, and I think that is a very valuable point. I don't think we ought to run away with the idea that the doctor is operating on everything that comes along. I believe he is dead right.

I have avoided doing it to the young, having gotten one nasty depression once. I didn't be sued for it that time, but I have been a little chary about it since. I thank the doctor. I am going to tackle some that I know have athology, and I am going to get after it.

Dr. A. W. Howe, Dacoma:

I think ProWindham should be given a great deal of credit for bringing up a subject in which he is advocating something which I think more of the men are very conservative about, that is, surgery of the septim in children.

From my own personal experience, I have done a submucous on those cases which were as a rule deflected by some injury.

There were two cases in which I set fractured noses and later had to do a septum in order to get good breathing space. In only one case in nineteen years have I had to do a septum which was of anatomic origin. That was a diagnosis of a general practitioner and it was evident that the anterior part of the cartilege laid quasi.

I think where we have to sacrifice middle turbinates in children, we should be very, very conservative about doing a septum. The doctor mentioned the fact that atrophic rhinitis was an indication for doing a septum. I felt that was a contra-indication for doing a septum. I think he has gone into this very clearly, and I know the doctor does it where pathology calls for it, and is not radical on the subject as one might a little bit think from all the reasons he gives for doing a septum. I enjoyed the paper very much.

Dr. Ralph A. Fenton, Portland:

I would like to ask Dr. Windham what is the longest period of time following the operation on one of these very young children that he has had the opportunity of observing the development of the nose, and also as to whether he has found in the literature any definite photographic study or other measurements of nasal development in his operative children, especially in the Edinburgh series? That would be enlightening as to eliminating the fear of stopping development. That is the fear most of us have in attacking these cases.

Dr. Moore, San Jose:

I should like to ask about the possibilities of although in the treatment of those cases?

Dr. H. B. Graham, San Francisco:

In children one has to keep in mind, the relationship between the generative organs and the nose. In obtain one notices a marked relationship between the development of the generative organs and the condition of the nose. This has been pointed out by experimental work on rabbits. If very young rabbits are subjected to a dissection of the turbinates it has been noted that the ovaries and testicles show a lack of development. If these animals live they show a very marked effect upon the adult and it is a question whether in the human being the same relationship will of occur—that if the turbinates are interfered with in very early life, there isn't a marked effect on the ovary and testicles in later the tribinates are interfered with the proven except in rabbits, but it behooves us to any attention to this work that has been done and see if we cannot find some relationship between the same condition in adults.

In Ozna we find that there is a pre-atrophic time when the child shows hypertrophy of the mucous membranes and it is very sad in the ozna cases to find that in the early stages of the ozena some doctor has

gotten hold of them and removed the turbinates. It is very difficult to make a diagnosis of a coming ozena in the pre-atrophic period so one should be very careful of taking out turbinates in very young children for fear he has a child of an ozena family that is liable to suffer from the effect of the operation later on.

Dr. A. W. Howe, Tacoma:

The doctor described his technic and when describing it I was thinking of a technic that Dr. Pratt of Minneapolis advocated in which he conserved a great deal of the cartilage of the septum. Going along and saving a part, he would go along the core of the nose with a swivel knife quite aways, almost to the attachment of the bony parts of the septum and then come up and then go back until he would hit a part of the bony septum and then down, saving almost the whole of the anterior part of the septum where it was straight and then after doing that he would put in an elevator and throw the cartilage to one side. I just offer that as a suggestion to those doing a good many in children, as it might be a good idea to save that.

Dr. F. W. Hilscher, Long Beach:

I just want to get up to compliment the doctor on his paper. I think he has stated things just about right. It is going a little bit farther perhaps than most of us go, but in the main I think he is right. I think we should not hesitate to do these operations wherever there is pathology and you can bet if you can give them good breathing space,

there are an awful lot of troubles disappear.

The main thing I wanted to talk about was the depression that might occur. I think most of those things come from going up too far and not leaving enough cartilage at the bridge of the tose, but I think that is mostly due to the swivel knife. I don't use the swivel knife at all and I think I have a good reason not to. I have seen these results that came about from other men who were otherwise very good operators and I always notice they usually use the swivel knife. If you will think about it a little bit you can see the swivel will hang down a little bit like that. When you push it, it doesn't always go just the way you think it is notice to be a suitable of the swivel will be suitable of the swivel will be said to be swively as the swivel will be swively as the swivel will be swively swively with the swivel will be swively swively swively swively will be swively swiv think it is going to go and instead of soing straight back and upwards, it is hanging down and before it coas that far it will make a little curve up like that much higher than you want it to go. Consequently, I use a straight, guarded chisel so of knife, and simply shove that up just in the direction I want and I never go any higher than I want to. Do that at the bottom and then you take an angular knife and take the cartilage out much easier than the other way and you don't run any

itself, or redireved, as the youngster develops the septum will straighten out. Whad a youngster with a sinusitis on one side due to a deflection. After getting the sinus cleared up, including washing the antrum two

or three times, preparatory to doing the septum, the youngster came back in a few months with a fairly good breathing space, so I let it go for a while and in the last two years the septum has straightened up markedly so I do not believe it now necessary or ever will be necessary to do a septum.

Dr. Windham, closing:

Submucous resections are done when you have pathology and when you have a very definite disturbed physiology. Don't always wait for pathology because that is one of the primary reasons for doing the submucous. If you are going to wait for pathology you would have a lot of pathology that wouldn't otherwise develop. A seriously upset physiology is one of the main reasons for doing a submucous.

The doctor mentioned atrophic rhinitis as being one of the indications. He misunderstood me. That was one of the complications of an uncorrected septal deflection.

Dr. Fenton mentioned the time of observation. My oldest case that I have under personal observation is five years. I have been rather fortunate. I have four cases on my floor of sons and daughters of physicians on the floor and I observe those almost daily and make frequent nasal examinations, take my own measurements and in some cases have made nasal molds of the nose to make sure there is no dropping or change there.

In reference to allergy, I have only done a very few cases; not quite facilitated enough to do that. Only a few cases I have taken that up with.

Relative to the doctor's statements regarding sexual degeneration from these operations, it is mentitoned in the early tages of the paper where I specifically stated that we must avoid althormal, physiological functions of the nose, particularly the areas of the erectile tissues, the swell bodies. Avoiding those, when you get through you have caused no disturbance of that phase of development?

Relative to the swivel knife, even though we use it as the doctor stated, when you pull forward you are likely to cause cartilaginous disturbance. I don't like to do at thing that might upest that attachment. I stated that the ment. I stated that I leave as much cartilage as possible anteriorly and as much superiorly as possible to leave and consequently I don't have any fear of deformities.

The doctor spoke about his septum straightening up. I think some of those cases are polyecessarily straightened septums voluntarily but the normal shrinkage of tissues. You will find more space and room which will appear to be a change in the septum, but it is probably a

approach of internal medicine and we ourselves must keep approach of internal medicine and pediatrics, in order to appreciate the proper relation of one to the other in order to do this type of work. In doing this work you must have close relation and close contact with pediatrics and internal medicine and we ourselves must keep abreast of internal medicine and pediatrics, in order to appreciate the

As mentioned, asthma is one of the symptoms and complications. It seems to me that if the pressure on these nasal filaments and the sphenopalatine ganglion will produce asthma and hay fever, what might not be developed of other physiological disturbances which might be more serious?

When you get this condition of respiratory disturbance it causes the increase of carbon dioxide and decrease of oxygen which has a tendency to upset the intestinal tract, increase the toxins, lessen the elimination, therefore, upsetting the nervous system and creating a general physiological disturbance. Respiratory disturbance with increase of carbon dioxide causes a general enemia, a mal-stimulation and general metabolic disturbance which causes in a great many of these cases, I think, as the doctor stated, a collapse of the areas of the recti tissues and the swell bodies, which might subsequently go into atrophic rhinitis and ozena.

Such men as Renaud, Byfield, Floyd and Dean have told us and laid great stress on the pus of the mastoids and sinuses and Marriott has mentioned the relation of pediatrics to otology and laryngology, but there is very little said as to the rhinological relation to the pediatric side and possible future disturbance from sinus trouble.

I have found breast-fed children and properly nourished children more resistant and can better tolerate a deflected septum and blocked nose than a mal-nourished, under developed child.

I have several cases in mind. One I expect to operate on when I return home which I have worried with for two or three years with the hope of avoiding this, correcting other conditions, all of which were perfectly futile as far as removing the condition and giving the child the advantage I hoped it to have the advantage I hoped it to have.

The disturbance as an indication for doing a mucous, you will find the child in one locality immediately adjacent to another locality will have the trouble in one and will not in the other. That may be only fifty or a hundred miles distance. Will find the disturbance in climatic conditions.

It has been brought out in this meeting already the attention to ears methods and great think by proper atternal a great perentage of the great difference of opinion and President Melbuser: I have now the Norval H. Pierce of Chicago, head of and Throat of the University of Chicago. as a prophylaxis against the mastoids, the operative technic of which we practically all agree on. I don't think there is any phase in our work in which there are more methods and greater variance of opinion than on sinus surgery and I think by proper attention to a condition of this type we will avoid a great preentage of these sinus infections, therefore, lessen a great difference of opinion amongst ourselves.

President Mellinger: I have now the pleasure of presenting Dr. Norval H. Pierce of Chicago, head of the Department of Ear, Nose

THE RELATION BETWEEN THE SUB-EPITHELIAL TISSUE (MESENCHYME) WITH THE MARROW SPACES IN EMBRYOS AND INFANTS

Norval H. Pierce, M.D., Chicago, Ill.

The illustrations are not going to be what they might be. I thought we would be prepared to show them immediately on the screen, which is very much better than slides, because by throwing the microscopic slides directly on the screen, we can show a much larger field. Without illustrations, I am afraid it is going to be rather dry.

The pneumatization of bones is a very interesting and a very important study and incomplete up to the present time. There is much to be done. As you know, the pneumatization takes place through the various villi of animals from the amphibians up to man. The process is in a general way very similar. It takes place along the same lines in a general way from the amphibian to man. First, the pneumatized skeleton, that is, the very pinnacle of this process, the whole skeleton being pneumatized, these cavities filled with air, which are all in direct communication with the lungs by these tubes, ventilated with respiration, expiration and inspiration.

The same is true of the cavities of the human skull, but I find that while the general plan is the same, the pneumatized spaces in the human, marked differences in the various cavities are found. In the mastoid, for instance, we find the old plan best represented. Pneumatized spaces are first nothing more nor less than marrow spaces. The marrow spaces in the mastoid are filled with true marrow, red marrow and are, therefore, very actively engaged in the fountion of blood for the individual, whereas in the maxillary antrum you have an entirely different picture. The maxillary antrum is not in the strict sense of the word a pneumatization of bone. It is a sac which begins in the soft tissues of the mesenchyme and the bone forms around it, after the cavity of the antrum has been well assoblished.

Between these two methods of laryon formation we have the ethmoid cells. Here again there is a difference in method. The ethmoid cells are never marrow spaces.

If I can show this on the screen you will see an anterior ethmoid cell taken from an infator three days after birth. You will see the section is through the cartilaginous box in which these cells are forming. As we slice the nose down in a series of sections from forward backwards, the first thing we see as we are approaching the cell is that the cartilage cells swell. They become swollen in a certain focus. The next we see a the appearance of the fibrilla taking the place of the cartilage cells. We know then that we will soon see a blood vessel always and a few slices farther on the blood vessel appears, and the nest in matrix as it may be called, becomes more and more lacy, more

and more fibrillated and we know soon in the successive slices 15 micromillimeters later we will see the appearance of the epithelium that has come in from the surface posteriorly and penetrated the cartilaginous box. We go on farther and we see the rod separated and we have the beginning of an anterior ethmoid cell—never any marrow. It begins with what physiologists call embryonic marrow, but this never goes on to the development of true marrow. It changes before true marrow is deposited in your ethmoid cell.

Note this: I am going to try to elicit certain practical deductions about these formations. In the case of the other extreme, in the case of the mastoid pneumatization, we see that primarily the pneumatization process depends on the blood vessel, just as in the ethmoid. In a fifty millimeter fetus, that is, at the time when ossification centers appear in the central bone, we see that the vascularization of the cartilaginous mass which is to make up the temporal bone is quite different in the region that is to be the mastoid than in the region which is to be the capsule of the internal ear. In the latter case we have the formation of ossification centers arranged in a fanshape . A primary blood vessel is sent in from the surface at eight different centers and that blood vessel rapidly breaks up and is distributed in a fanshape manner and ossification immediately sets in in a fanshape manner, whereas the blood vessels in the mastoid are distributed like grains of pepper all through this region, not fanshaped, but individual, distinct blood vessels are sent down into the cartilaginous mass that is to be the mastoid process. Each one of these blood vessels contributes to the formation of certain marrow spaces because the marrow spaces form about the blood vessels, and it is for this reason that the mastoid pneumatic spaces eventually communicate with the antrum the mastoid antrum, following the distribution of these blood vessels.

The maxillary antrum, on the other hand, never goes through either one of these processes. A process of epithelium is sent down immediately from back of the uncinate process which is sent out by cartilaginous strip, and at the end of that epithelia trip we have an enlargement occurring. It is difficult to tell at the beginning whether it is a gland or whether it is surface epitheline but we know by its development anterior and posterior that it is the maxillary antrum. The bone has nothing whatever to do with this. There is not even the primary marrow space of the ethmoid tells. It is simply an enlargement of surface epithelium in the mesenchyme, in the soft tissues themselves and this is surrounded secondarily and altogether aside from the formation of the antrum, by containing the bony walls much later in the fetal life by the ossilication of the cartilaginous box and especially by fetal life by the ossilication of the cartilaginous box and especially by the membranous oscilication of the maxillary process.

entrangle with the former marrow space of the epithelium in the antrum. From a little bit before birth (the Germans are a little bit behind us)

on to the fifth year active pneumatization of the mastoid is going on, and it goes on all through life, but at the end of the fifth year the type of mastoid of the individual is fixed. All this time the surface of the tissue of the mastoid can be said to be in direct communication with these marrow spaces. Whatever goes on on the surface, the formation of toxins from any cause, must be absorbed by this very delicate tissue and is carried directly down into the marrow spaces, which is simply a mass of blood vessels with every exceedingly thin endothelia keeping the stream in place, the various streams of blood in place.

We have here, then, an apparatus which is exactly adjusted to those curious phenomena that occur in children, infants and young children, which have been considered under the head of decomposition. Dean, as you know, was one of the first, if not the first, to call our attention to these conditions. It has been known for a long time that given an infant with or without, usually with a diarrhea and a loss of appetite, dehydration and rapid great loss of weight, if you couldn't find anything else, cut the tympanic membrane. They did that in a purely blank manner. There was a professor in Germany who went around with a tympanic knife in his hand and they called him "Herod" because there were so many deaths in his clinic, but in our own country this has been advised in children, even if there is no absolute symptom of involvement of the middle ear.

Dean has gone further and has actually cut into the tympanic antrum in cases of this kind where there was what we might call an inadequate symptomology as to involvement of the middle ear, and he has reported great success in children where diet and medication of the intestinal canal have proved futile. Now, I don't know. Don't for a moment think that I am advocating the early master dectomy in children with decomposition, but I can only say this, that we have the apparatus here that is nicely adjusted to the absorption of foxins in a great volume and with great rapidity and constancy from the middle ear. There can be no doubt about that.

There may be inflammation occurring in this embryonic tissue that is peculiar. I am not at all sure although it is perhaps heterodoxy, that whatever prevents pneumatization (they call it otitis media neonatorium, which is a term without definition) a vast number of these cases are sterile on cultivation of this material we find in the ear. It isn't a true pus. In other cases, fewer in number, you will find almost exclusive pneumococcus. It isn't altogether unlikely that we have an inflammation which that be caused by a modification of a microorganism, or it may be observed in the blood which may produce the phenomena of decomposition in the tissue themselves without the aid of microorganisms. I could imagine that this could occur. We know that there is something which causes this otitis media neonatorium and that something causes a change in the mesenchyme which prevents it is placing the marrow cells, or if it goes to the point of replacing the marrow cells, it is resistant to the entrance into these marrow cells of

the surface epithelium, in other words, preventing pneumatization. Something occurs there. Whether that is a bacteriological or a biological affair, we do not know. We know this. We have recovered from these cases a foreign toxin. It is difficult to say whether it is a foreign toxin or whether a normal blood toxin, but at least it is not identified. If, as we hope, we may prove the identity of this toxin, diagnosis then may be made by the use of this toxin, vaccination of the infant and recovery of that toxin from the blood to differentiate between the intestinal decompositions and the decompositions of this type. This work is now being carried on at the University of Illinois.

In the antrum we have a very similar development, about the ninth month or before. This mesenchyme which forms about this process of epithelium, so-called cell, epithelial tissue, is in direct communication with the marrow spaces of the maxillary bone. There is no bridge of bone protecting it against infections. Whatever forms in the maxillary antrum at birth or toward the sixth year or even the seventh year has egress, entrance to the marrow spaces of the maxillary sinus. Here, too, in the maxillary sinus we have an apparatus that is nicely adjusted to the absorption of toxins from its cavity in the marrow spaces. Then, as you know, the marrow spaces are about the best means of distribution of toxins to the body as a whole. We know that in osteomyelitis that law holds.

These cells are really never marrow spaces. It is only in later life that the submucous tissue is in communication with the marrow spaces. The bone forms around these cells and, of course, the bone must have marrow spaces and strands of tissue to penetrate. I believe we can trace hypoblastic conditions to arrest of pneumatization; in other words, the thickened mucosa of hypoblastic rhinitis, hypoblastic ethmoiditis, is nothing more than a survival of the embryonic tissue of membrane, largely composed of the sub-epithelial embryonic tissue which can be identified by the great number of star cells. This tissue is invariably less resistant than a normal epithelium, a normal mucosa.

In measuring the mucosa of one hundred maxillary antra, I found that the thickness of this mucosa varied from 100 to 860 micromillimeters. Surely normal mucosa cannot vary to such an enormous extent. These cases were not suffering from disease, but were picked at random, but the 860 micromillimeter nucosas were largely composed of embryonic mesenchyme, with some deformity of the epithelium, increase in blood vessels, as we find it the embryos, but as to the normal mucosa, which if you will admit which establish the type of the normal, because it is rather rare—in the normal type, the sub-epithelial tissue and the mesenchyme is composed of a very thin strip of tissue, rather poor in blood vessels, without glandular tissue (I am talking about the mucosa of the maxiltary sinus and of the ethmoid) and the periosteum there cannot be distinguished even under the microscope, or if it can be distinguished, it is with the free use of the imagination, from the sub-epithelial tissue proper, but as to the so-called hypoblastic tissue, it is

identical as far as we are able to observe, with the embryonic tissue that you have seen in this young growing bone.

President Mellinger: I know this has been a very trying situation for Dr. Pierce and we are very sorry the apparatus wasn't equipped to take care of these slides. Has anyone any question he would like to ask Dr. Pierce?

Dr. Eugene R. Lewis, Los Angeles: Just about the last sentence you said something about it being very poor in vessels and practically no glands within the periosteum—no glands at all?

Dr. Pierce: The glands vary in numerosity as to the situation. They are rather numerous on the nasal wall, but as you depart from the nasal wall, either toward the floor or the roof, they become fewer and fewer, until on the facial wall there are scarcely any, whereas, in the other type of tissue you will find them distributed much more numerously on the facial wall as well. I don't want to insist on this as being of universal application. I only say this has occurred.

In the mastoid antrum the epithelium is a thin membrane composed of even one layer of cells or two layers of cells, pavement mesenthelium. It changes very abruptly at the point where the Eustachian tube enters into the cavum, the Eustachian tube, of course, lying covered with cylindrical epithelium, which is characteristic of the whole respiratory tract, ciliated cylindrical epithelium, but the moment it gets to the border of the tympanic cavity the characteristic epithelium changes and you have this flat cell. There is a place for investigation right there. Where does that flat epithelium come from? But it is there.

In cases of arrested pneumatization we invariably had patches of cylindrical epithelium displaced all over this cavumtated in the antrum. That is a sign of this process of arrested pneumatization. In the case of the epithelium of the antrum and of the accessory sinuses, in my studies I have found cylindrical epithelium. Undoubtedly in long, progressive, chronic inflammations this epithelium may be cast off and pavement epithelium be found, but in these studies that I have referred to there is no change. We always first cylindrical epithelium, but it is a deformed epithelium. Whether that deformation is due to the process or whether it is due to a decomposition of the body before we get it into the fixing solution, I can be say. I wouldn't for a moment insist upon that. It is one of the awful things of our country that we can't get pathological normal material properly preserved. It is exceedingly difficult to get bodies of children from birth to five years. There is too much sentiment to tit, and perhaps the sentiment is all right, but it prevents us from getting the heads or performing even many internal autopsies. It is very difficult to get this and it is also very difficult to get adult material in a fresh stage. In Chicago they have to hold the bodies set and days before we are allowed to do an autopsy, and in the meantime they are on ice, with more or less decomposition, so those very fine than it is won't insist on as being absolutely correct, but in these studies we find cylindrical, but never pavement epithelium.

Dr. Frank E. Brown, Salem: I wanted to ask if interference with ventilation of the Eustachian tube had anything to do with arresting development within the mastoid cell?

Dr. Pierce: As I understand it, you want my idea as to whether this susceptibility to disease is the same in a child or in an adult. There must be a distinction. I can't see how after a mastoid, for instance, is developed, its type established, we could have a phenomena of decomposition in an adult. We do, of course, have chronic inflammations that are actually dependent on this arrested pneumatization, peculiar inflammations. Cholesteatoma would never occur in a normal pneumatized mastoid. We must have this cushion of mesenchyme with abnormal epithelium to produce cholesteatoma. We must have the cushion of mesenchyme to have these so-called chronic catarrhal inflammations. In other words, we do not have a sclerotic mastoid because of inflammation. We have a sclerotic mastoid because pneumatization has been arrested at the beginning and whenever by the skiagraph you see a mastoid that is not pneumatized, you may know we have hypoblastic, thickened mucosa, and this is the old embryonic mucosa that has gone on through life.

: Would that apply to the antrum?

Dr. Pierce: Yes, I believe to the antrum also.

(same questioner.) You think the blood channels are just as open in adult life as in childhood?

Dr. Pierce: As the normal bone goes on developing, these marrow spaces take the course of any marrow space in the body. They close up gradually. This marrow is resorbed and replaced by yellow marrow, for instance, and by fibrous tissue and by various tissues, we olar tissue that we find in the long bones. That bone goes on developing as the ordinary bone goes on to develop and the blood vessels become less numerous, of course. The walls of these cavities become thicker and close in so that we have, cutting open one of the sclerotic mastoids, an adult, while the spaces may be large, the total may be larger than normal, yet we have a picture of a bone that is sclerosed, but the absorption of toxins does not probably occur in adults as in infants, because there this fresh young tissue of the marrow spaces is in direct communication with the sub-epith tial tissue of the maxillary antrum and of the mastoid antrum.

About the Eustachian tub, I don't believe it has anything to do with pneumatization. The infant Eustachian tube is quite short and very open, so that ventilation is done rather well in young infants at the time when pneumatization process is most active. Pneumatization mostly occurs before birth, so that it doesn't depend on respiration altogether. In later life I have no doubt but what insufficient ventilation might have at indirect bearing upon this condition, but just what that bearing is bouldn't attempt to evaluate at the present time.

We should always clinically try to establish a patulous tube because there no doubt but what we can have air in a normal cavum

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by insufficient ventilation and that is enough of an idea to suggest that we should always keep the Eustachian tube open as much as possible, even in a chronic case.

President Mellinger: I want you to know that Dr. Pierce has been living in California for a part of the winter, but he should have been back at his work in Chicago something like three or four weeks ago, but the University extended his time that he might be with us, and I want Dr. Pierce to know how much we appreciate what you have done for us.

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OPERATIVE CURE OF CHRONIC SUPPURATION OF MAXILLARY SINUS, INCLUDING ORAL FISTULAE

John H. Harter, M.D., Seattle, Wash.

My purpose in writing this paper is that I have handled this problem and attempted to solve it in various ways, and having arrived at my present convictions, the outcome of these cases has been so consistently satisfactory to me and my patients that I felt it worthwhile giving to the profession my convictions on this subject.

I appreciate how long these programs are, and so certain phases of my paper I shall not read. It will be published, and if any of you take special interest in it, you can look up these details at your leisure.

INTRODUCTION

It has seemed to me that the usual article on the operative treatment of chronic suppurative sinusitis is so padded with oft-repeated historical data and so filled with axiomatic generalities that the reader is left bewildered as to what procedure the writer actually relies upon.

This paper gives no historical resume. It does not quote from authority. It states and attempts to defend the author's present convictions and relates the disappointments and failures which led to these convictions. It criticizes this and other methods from the standpoint of the rhinologist doing private practice. It summarizes the results of the present operative procedure in the author's hands.

In this article, for brevity, the term antrum is used synonymously with maxillary sinus. Operation is not considered unless suppuration continues after a reasonable course of irrigation. The special microorganisms present seem to have no bearing upon healing before or after

operation.

SURGICAL ANATOMY

The maxillary sinus has anatomical characteristics and connections which are of surgical interest:

- 1. After about twelve or thirteen years of age it hollows out the entire cheek bone. It is therefore practically always constant in location and symmetrical on the two sides.
 - 2. The ostium is near the top of the cavity.

3. The antral floor, qually lower than the nasal floor.

4. It is not unusual for some of the teeth to project into the antral floor being covered by a very thin plate of compact bone.

5. The neo-antral wall in its anterior portion slopes markedly lateralward.

6. The only large vessels encountered in surgery of this cavity are the position palatine which are found far back in the naso-antral wall.

- 7. There is a strong natural tendency toward spontaneous closure of a fistula from maxillary sinus to mouth.
- 8. The maxillary sinus as opposed to the other sinuses has no dangerous vascular connections with the brain or its coverings.

CRITICISM OF INTRA-NASAL OPERATION

From many considerations theoretical and anatomical, from the results of my own earlier endeavors and from the observed end results of other operators, I view with disfavor the intra-nasal operation.

The cramped space of the anterior naris, the lateralward slope of the naso-antral wall, the presence of the inferior turbinate; put the surgeon at a great mechanical disadvantage. Inspection of the sinus with removal of polypi and other pathological tissue cannot be done with the same thoroughness as through a window in the canine fossa.

To offset these mechanical disadvantages a great portion of the inferior turbinate is often removed. Inspection of one of these mutilated noses will bring the conviction that from the physiological standpoint the intra-nasal operation should be called, not the conservative but the radical one.

The great number of recurrences of suppuration following the intranasal operation furnishes practical and conclusive evidence against this procedure.

CRITICISM OF LUC-CALDWELL OPERATION

In my first years of practice I did chiefly the Luc-Caldwell operation with many cures. The following case reports will show how an occasional failure and disappointment led me to seek another method:

Case 1. Miss E. M., aged 19 years. Right suppurative maxillary sinusitis—duration five years. Luc-Caldwell operation in 1921. Ether anesthesia. Post-operative period uneventful. Discharged as cured. One year later patient returned, stating that she believed that this cavity was again discharging. It was dark by transillumination, slightly tender to pressure, and there was some mucoid discharge in right side of nose. I attempted to pass a cantula, but could find no opening. I punctured the nasoantral wall, with trocar. The patient complained of much pain, and there was a targe amount of blood in the irrigation fluid. This patient never returned to my office, although I knew personally her entire family. It was a disagreeable and an impressive experience.

Case 2. Dr. L. D., aged 30 years. Left suppurative maxillary sinusitis. Duration to years. Irrigated three times weekly by me for six months within benefit. Luc-Caldwell operation October, 1922. Ether anestherd. Convalescence uneventful. Discharged as cured after three teeks. Fourteen months later he returned, stating that he believed this cavity to have become reinfected during a recent head cold. The antrum was dark by transillumination, tender to pressure with some muco-pus in nose. I attempted to pass a smooth cannula in sinus but could find no opening. I also assured him that this was

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undoubtedly an acute condition that would disappear with conservative treatment. He, however, being a personal friend and knowing just enough about nasoantral windows to make him inquisitive, insisted that I irrigate the antrum. I attempted to do this with trocar and cannula, but the bone was so hardened and thickened that I was unable to puncture it. This sinus cleared up quickly under simple reatment, but this again was a disagreeable and humiliating experience. These two cases typify the disappointments which led me to abandon the Luc-Caldwell operation.

Another case report will be included here, as it furnishes evidence against the Luc-Caldwell operation. It belongs, however, in the group of cases operated on by me with the Denker method.

Case 3. Mrs. E. A. B., aged 50 years. Bilateral maxillary sinus infection. Duration about three years. One year previous to coming to me had a left Luc-Caldwell operation by one of my colleagues. It was easily determined that there was purulent discharge from both maxillary sinuses. Quoting from my operative record: "The window in canine fossa made at previous operation is closed with smooth bone except a vertical slit 3 mm. wide and 9 mm. long. The cavity of the maxillary sinus is entirely filled with a mass of fairly hard bone. Within this and extending about perpendicular to the naso-antral wall are two suppurative tracts about 3-4 mm. in diameter and emptying into inferior meatus."

Criticism against the Luc-Caldwell operation might be summarized as follows:

1. Tendency to great narrowing or closure of the maso-antral window.

2. Tendency to thickening of the naso-antral walk.

3. Tendency to formation of irregular suppurative tracts within new formed bone.

4. Impossibility of properly eradicating disease in the anterior naso-antral angle.

5. Failures to cure suppuration due robably to one or all of the four factors mentioned above.

TECHNIQUE FOR DENKER OPERATION LOCAL ANESTHESIA

Cathartic second night before operation. One hour before operation H.M.C. No. 1 in 2 cc. 25 fer cent mag. sol. by hypo. If patient is markedly under weight particle decrease this dose. Twenty minutes before operation patient is examined and is usually given another H.M.C. No. 1 or No. 2 as deeped advisable. Arriving at operating room patient should be just awake but not interested in the surroundings. Many patients are as the during most of the operation. Sometimes they remember a training of it. I have never had the least difficulty with the general transvior of the patient and my series includes several who are extremit high-strung, touchy, and nervous. The slightly reclining

sitting posture is used. A strap is placed around the patient's waist. One per cent novocaine and ten per cent cocaine solutions with adrenalin are on operating table. The cocaine solution is colored red, so that no mistake can occur by interchange of these.

The face is cleansed with alcohol and except within the nose and antrum asepsis is earnestly attempted.

The nasal cavity on this side is packed to the upper level of inferior turbinate with gauze squeezed out from the cocaine solution.

Novocaine is injected over the canine fossa, keeping close to the bone and going up to include the infraorbital nerve. A horizontal incision is made across the canine fossa and tissues elevated above this. A small opening is made through the canine fossa into the maxillary sinus and this cavity is packed with cocaine gauze. After waiting about ten minutes for the cocaine gauze within antrum to act, one proceeds by removing a narrow strip of bone from the original opening into antrum over to the sharp edge of the pyriform aperture. The interior of the antrum is then treated as indicated. Following this the mucoperiosteum of the inferior fossa is elevated and the bony naso-antral wall removed. The mucoperiosteal flap of the inferior meatus is then cut anteriorally, above and posteriorally and turned onto the antral floor. It is packed there with one-inch nugauze saturated with ten per cent argyrol, free end in nose, and is allowed to remain for four days. The cavity is irrigated twice weekly until dry.

Now let us consider the controversial point as to whether or not the lining membrane of the antrum should be removed. With the Denker operation it must in every case be removed from the portion of the floor adjacent to the nasoantral wall, so that the mucoperiosteal flap will become adherent here. As regards the remained of the cavity my conviction, backed up by experience, is this: If the lining membrane is smooth with no polypi and no edematous masses, it should be left in situ. The healed cavity then is similar to the normal antrum except it has a large ostium at the lowermost postion. If the lining membrane is polypoid, edematous or necrotic it stealed be entirely removed. The antral cavity then becomes largely obliterated by osseous and fibrous tissue, and is lined by stratified squamous epithelium. I firmly believe that the one who says the lining membrane should always be removed and the one who says it should never be removed are both wrong.

SPECIAL OPERATIVE PRECAUTIONS

1. Make the increase across the canine fossa high. Several of my patients have had upper plates and all have been able to wear these afterwards.

Make the initial opening into antrum well lateralward and high as otherwise one is apt to enter the nasal cavity.

At the anterior naso-antral angle do not remove the bone any lower than necessary, as the root of the canine tooth in a small per-

opening into a specific property of the anterior naso-antral a specific proper

- 4. Complete the treatment of the antral cavity before removing any of the naso-antral wall.
- 5. Never remove any portion of the inferior turbinate at the time of the Denker operation. In some cases it is necessary to remove about one cm. of the anterior shoulder of the turbinate. This can easily be done before or about three weeks after operation. If done at time of operation the turbinate has lost much of its stability and one is apt to take off more than desired.

FISTULAE FROM ANTRUM TO MOUTH

In considering fistulae from antrum to oral cavity the fact should be kept in mind that there is a strong natural tendency toward spontaneous healing. Therefore such a fistula denotes:

- 1. Persistent discharge within the antrum with seepage into fistula, thus preventing healing.
- 2. The presence of a large bony opening in the floor of antrum often associated with
 - 3. Epithelization of fistulous tract.

These fistulae may be divided into three treatment groups:

- 1. Small fistulae admitting only a probe occurring usually on the alveolar ridge. After the Denker operation these tracts should be roughened with small burr or cotton wound applicator at intervals of about two weeks and with the cessation of discharge from antrum the fistula will heal.
- 2. Large openings within the alveolar ridge. Make the original canine fossa incision so as to include the mucoperiosteum over buccal aspect of fistula. After completing Denker operation remove the buccal plate of fistulous tract, and apply the mucoperiosteum to the freshened lingual surface of fistula.
- 3. A large opening from antrum through the hard palate becomes in reality a partial cleft palate and requires the operative procedure.

Before summarizing results in my deries and in order to show what may be expected with the Denker operation in difficult cases, the following brief case reports are given:

Case 4. Mr. C. J. S., aged 36 years. Discharge from right side of nose for a long time. Incanasal operation right antrum seven years ago. Luc-Caldwell operation on this cavity five years ago. I irrigated this antrum twice weekly for period of six months while working up my technique or the local anesthesia Denker operation. The return flow of pus was very profuse and extremely foul. During this time he had diatherm areatments of antrum by another physician. Denker operation done November, 1924. Patient has remained completely and. He is a singer and local radio announcer and he and his Oxditiled by friends have sent me many sinus cases.

Case 5. Mrs. I. A., aged 26 years. In 1920 had a series of left antrum irrigations. In 1928 referred to me by her dentist. I irrigated left antrum several times with return of thick pus. No improvement. Large intranasal window made in inferior meatus. After few more irrigations patient was cured. I charged her \$75.00.

Six months later, with a cold, she had a return of symptoms. She then went to one of my colleagues, who also irrigated the left antrum, made an intranasal window, cured her, and also charged her \$75.00.

After about six months, with another cold, she had return of symptoms, but deciding that the disease was better than the attempted cure, she stayed away from physicians.

In October, 1927, four years after my intranasal operation, she again told her troubles to her dentist, and he, assuring her that in the meantime I had learned how to cure these cases, prevailed upon her to revisit me. Denker operation October, 1927, resulted in a complete and satisfactory cure.

SUMMARY OF CASE REPORTS

From July, 1924, to present date, I have had thirty-one patients, with thirty-eight Denker operations. There were two cases of oezena, with three Denker operations. Not counting the oezena cases, twenty-nine patients with thirty-five Denker operations. Youngest patient nineteen years. Oldest patient was sixty-seven years old and is now seventy-one years of age. Aveage age thirty-seven years. Females fifteen. Males thirteen. Thirteen patients had previously an intranasal operation; two, Luc-Caldwell operations.

Two patients had each a fistula to mouth. All these patients were observed through convalescence until antra were dry and all but eight are still in my practice and have been seen many times. As far as I can determine, all have remained entirely cured.

There was only one post operative complication. A man aged forty-seven years developed subcutaneous injection of the cheek adjacent to buccal incision. This was defined below the mandible and healed promptly without noticeable soar.

In twelve cases there were no teeth present beneath the antrum.

CRITICISM OF DENKER OPERATION

Let us consider the user criticisms of the Denker operation:

- 1. The alleged accumulation of discharge within the antrum and the sudden dumping of this into patient's lap upon lowering of head. No tendency town this has existed in any of my cases. I believe it will never follow. Denker operation properly performed.
- 2. The desensitization of the teeth. Any operation in the canine fossa will emporarily destroy the sensory nerve supply to the underlying tech. But the anastomosing blood supply is not destroyed and therefore the tooth does not die. We have learned to think that a description of the destroyed and therefore the tooth does not die. We have learned to think that a description of the teeth.

oiditized by

in a tooth by filling the root canal he thereby also shuts off all blood supply to the tooth. This does not hold true in teeth desensitized in a canine fossa antrum operation.

- 3. Weakening of the bony framework of the face. In re-operating on patients who have had a Luc-Caldwell operation it is noted that the bone of the canine fossa largely reforms. This criticism of weakening bony framework may also be brought against the submucous resection and against some plastic operations upon the nose. This risk must be weighed against the advantages.
- 4. The mechanical difficulties of the Denker operation, which is without question far more difficult than the intranasal or Luc-Caldwell operation. If an intranasal operation has been done previously in the inferior meatus, the mucoperiosteum is transformed into scar tissue and the making of a perfect flap may be impossible. However, I have been able even in these cases to make enough of a flap to secure a permanent opening. Local anesthesia makes this operation feasible to the nasal surgeon of ordinary skill.

CONCLUSIONS

I favor the Denker operation, local anesthesia, for the following reasons:

- 1. It is reliable. The patient can be assured that unless unusual complications arise he can leave the hospital in four days, return to work in ten days, and that after healing, the cavity will be no more subject to infection than is the lining membrane of the nose.
- 2. At any time following operation a straight applicator or cannula can be inserted into antrum and irrigation will demonstrate to the patient that no suppuration is present.
 - 3. Disease in the anterior naso-antral angle is exadicated. Hemorrhage and shock from operation are minimized.
- 5. Post operative period is shortened and painful after treatments are avoided.

Discussion opened by Dr. Frank B. Kistier, Portland, Ore .:

We agree with Dr. Harter so far to say that radical operation offers the surest means of cure in plajority of cases, but we feel sure that with careful diagnosis there is a minority that can be cured by introped and the cure of the cu intranasal drainage, and that here are those, including infants and young children, in whose case it is very advisable to try the conservative operation first tive operation first.

Dr. Harter has the but one indication for his radical operation: He says: "operation is considered only when suppuration continues after a reasonable course of irrigation." It is in the non-suppurative, polypoid or catarrhal type of sinusitis that we believe the radical propand provided and serious diseases. cedure is practically always indicated. In many of these cases one gets no pust other gross or microscopic, from washing, yet the lining is degenerated and the infection it carries is frequently the cause of many

Other indications for the radical operation are extensive thickening of the lining and extreme chronicity recurrence, after apparent cure by conservative measures and any evidence of tumor formation. We have not been able to make a diagnostic distinction between polyps, simple cysts, cystic abscesses and bone cysts and beginning malignancy may be mistaken for any of these, and we think the patient should be given the benefit of more accurate diagnosis by examination through an opening in the canine fossa. The diagnosis of tumor is usually made from the X-ray findings with or without the use of lipiodal. We have found that the contents of a simple serous cyst may carry streptococci, while an apparent cystic abscess may be sterile. X-rays have been so much more satisfactory that we never use transillumination when radiography is possible.

In his criticism of the Luc-Caldwell approach to the antrum, Dr. Harter says there is a great tendency to the formation of irregular suppurative tracts within new-formed bone and farther along he advocates conservatism in the removal of the lining mucosa of the antrum.

We feel sure that the formation of these irregular cul-de-sacs or suppurating tracts is the direct result of partial removal of the mucosa. When you have removed the mucosa, you will have granulation tissue and where you have not you will have a secreting mucous membrane which must have an outlet for its secretion or form a cyst and the end result is either a fistulous tract or a cyst or a cystic abscess. histologic examination we have invariably found intact mucous membrane at the fundus of these tracts, and have concluded that it is better to leave the lining intact and simply make a drainage opening or remove it entirely. We believe that more failures are due to incomplete removal of the lining than to any one single factor. I am skeptical of the ability of anyone to determine that one portion is infected and another is not. I know that there may be injection with very little gross change in the appearance of the lining.

I think that removing the heavy botte at the margopymfornices as in the Denker operation, if necessary, as am sure that the entire lining can be removed by subperiosteal resection without disturbing it.

I am interested in Dr. Harter statement about desensitized teeth. Does he mean that the nerroun be destroyed and the pulp not be degenerated? And if so, what is his authority? It would be a great relief to me to know that his is true.

Dr. Joseph D. Lewis Canta Barbara:

This is a very interesting subject, and I think Dr. Harter has presented it in a proposition interesting way, but I believe that he is conveying the impression that radical operations are more frequently necessary why does the intranasal operation fail? It is largely for this reach that we have been taught, I think erroneously, to make our opening at the most dependent point, at the floor of the nose. For

anatomic reasons, surgically that is wrong, unsound. the incision should be made at the inferior turbinate, but the inferior turbinate can be elevated and replaced, but if the opening is made very large under the inferior turbinate as far as you can and as large as you can, they rarely close for the reason that you are remote from the blood supply which is here at the base in the thick bone. We know that thick bone granulates quicker than thin, and when you get into . the thick bone of the sphenoid, you get granulation. Why not work in the thin bone, and they punch easier. These cases that went to radical operation, with large opening, can be cured.

With the Denker operation or the Luc-Caldwell operation, if this work on the bone here is not properly done, you have devitalized teeth. It is a mistake to work transversely in operations on the maxillary, again fundamentally unsound surgically. Work vertically, and then if you do get some teeth you will not get many. There is no objection to making the incision transversely, but the work on the bone should be

done as much as possible in the vertical way.

One other point with reference to closing the fistulae. In my humble opinion, based on rather broad experience, there is only one way to successfully close those fistulae. I mean in the highest percentage of your cases, and that too is based on sound surgical principles. It is the method recommended by Gardner. It is a plastic operation and results have been uniformly good. If flap is brought up with blood supply, the blood supply is from back forward and then it is going to devitalize. Bring up a big flap, dissect it loose here and bring it across and stitch. There is no interference with blood supply, and if your technic is good it will close every time.

Dr. P. C. Means, Santa Barbara:

One idea about the fistulae. I wish we could go dentist to be a little more scientific and close those things up when they find they have made a hole up in the antrum. Sometimes they don't tell the patient and we find it out months of towards. patient and we find it out months afterward, after you have a foul sinus condition, but if they would stitch chose up after cleaning them

out as well as they can, or allow them to heal and not try to irrigate through there, it would save us a lot trouble.

There is one other little thing that I ran across two or three years ago, and that was that some of these fistulae can be stimulated to close regidly by principle them. rapidly by wiping them out oacking them for a moment or two with a liniment. It isn't diagreeable to the patient to use and it will stimulate those fit lae to close pretty rapidly, even when rather large, especially if the patient happens to be in bed from feeling that them up and constant them up and constant them up and constant don't think he need do a Denker. The failures in the Caldwell method they must be there because those things do heal marvelously when the

are due to the fact that when you take the bone out underneath the lower turbinate and the lower turbinate drops and you get adhesions along the whole floor, you do not get any drainage. I think this can be obviated by enlarging the normal opening of the sinus in the middle fossa, the thing Dr. Sewall and I have done for some time, and I think it is satisfactory.

Another thing, if the lower turbinate is low and you are sure it is going to come to the floor, make a V in the middle or back part and

thereby you insure permanency of drainage.

Dr. C. Benson Wood, Los Angeles:

In regard to these sinuses following the extraction of teeth in a clean antrum, I have found that I have gotten a great deal of help in the closing of them by having a dentist make a thin gold saddle which fits tightly over the area and clamps over the adjoining teeth. I think many of these cases are prevented from healing by the air currents which are carried on through that sinus and possible infection of food.

Assuming you have a clean antrum and a sinus which is a little slow in healing, just have a little gold saddle made to fit on which prevents the air going in and keeping it open. I have found it to be a big help.

Dr. E. F. Tholen, Los Angeles:

I just want to say something about the fistulae. In answer to Dr. Means, the great majority of the fistulae made in the antrum by dentists will close spontaneously and do. These openings are made much oftener than people think. It is only the occasional one that doesn't close, and I think you can't suture them very well, but if a dentist is taught not to put any packing in the antrum or currette in there, but just let nature take its own course, these distulae will close nine times out of ten, and even if they do open great majority will granulate. It is only very rarely that fistulae will stay open and need any surgery.

Dr. Harter, closing:

Dr. Kistner remarked that these cases need exact diagnosis. This paper was devoted entirely to operative treatment and therefore did not include any details as to diagnosis. This would make a large paper in itself.

Dr. Kistner is inclined recommend the intra-nasal antrum operation. In this series thirteen patients had previously had this operation, moreover it makes the Denker operation, if required, much more difficult. I therefore never practice it except in some cases I make a single opening with an antrum chisel, which allows drainage and easy irrigation for some five or six weeks.

Concerning desensitized teeth: I have four cases which are now four years After the Denker operation. Recently I had the teeth underlying these antrums X-rayed and they are normal, there is no sign thany abscess formation. Dr. O. T. Dean, an oral surgeon of wide Digitized by experience over many years, tells me he has never seen a tooth lost because of antrum operation unless there was evidence that the root of the tooth had been damaged at time of operation.

Dr. Kistner says he believes in removing every bit of the lining of these chronic antrums. Other good men advise never removing any of the lining even though polyps be present. They claim that if one makes a big window the polyp will shrink and disappear. I have my own convictions on this subject and from these varied opinions each surgeon must take his own choice.

Dr. Brown advised taking out a small portion of the inferior turbinate. You will find that also in my paper. It is sometimes necessary with a Denker operation. I was interested in what Dr. Wood said about the gold saddle and it sounds like a good idea.

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Local Anesthesia in Surgery of the Ear, Nose and Throat

Joseph D. Lewis, M.D., Santa Barbara, California

For many reasons the subject of anesthesia is one of cardinal importance. The advent of local anesthesia has had an enormous influence on the advancement of surgery of the head and neck, and its scope is rapidly widening.

In this brief article, I cannot attempt more than an outline of the principles essential to the development of the local method of anesthesia, point out some of its chief advantages, and offer a few suggestions drawn from my own experience, hoping thereby to stimulate further inquiry and a greater interest in this live and engrossing subject.

While Rottenstein in 1866 used a spray of ethyl chloride to temporarily obtund superficial cutaneous sensation—a method which was revived by Redard in 1891—local anesthesia was really the product of two men, namely, Wood, who introduced the hypodermic syringe in 1853, and Koller, by the discovery of the practical value of cocain as a local anesthetic in 1884. Braun added a tremendous stimulus to this type of anesthesia by the introduction of novocain into the practice of medicine in 1905, when, it may be said, the method reached its height.

Judging from the comparatively few major operations done under local anesthesia, it is inferable that the method is either under-estimated or imperfectly understood, and doubtless Farr had this in mind when he wrote: "Many of the profession fail as yet to see the great value and true scope of local anesthesia in general surge." But with a better understanding of the advantages of local anesthesia, together with the improvement of technic, we note an increasing popularity of the method.

There are many drugs which have ment as local anesthetics, but as cocain and novocain have proved the most efficient, and since time and space do not permit, the other drugs in this category will not be considered in the present article.

The subject may be approached by first reviewing the disadvantages of general and local anesthesia, and then, by contrasting their merits, we shall have a basis for Comparative evaluation of the two methods.

General anesthesia ocontra-indicated during the terminal years of life, as the aged are obtained subjects for this type of anesthesia. Among the maladies which involve a degree of danger which frequently does not justify the use of inhalation anesthesia are: Diseases of the kidneys, particularly diabetics, acute virulent infections of the nose and throat, pronounce bulmonary involvement, occasionally mitral stenosis, severe liver distale, operations on the brain, especially when intracranial pressure is increased, alcoholism, asthma, obesity, marked debility and prostration, pronounced anemia, or when hemorrhage is an added risk. It

is therefore clear that in some cases it is absolutely necessary to employ local anesthesia. Among the post-operative complications of general anesthesia may be mentioned acidosis, post-operative pneumonia, lung

abscess and surgical shock.

The contra-indications to the use of local anesthesia are few, and post-operative complications practically nil. It cannot often be employed in operations on children largely for the reason that co-operation is not possible owing to the apprehension natural to their years. In infants, however, local anesthesia is the method of choice for several operations on the head—for instance, harelip, cleft palate, tracheotomy and mastoidectomy. But aside from acute infections of the cervical tissues and diffused cancerous lesions, practically every other condition of the head and neck demanding surgical intervention may be done satisfactorily under local anesthesia. And it must be mentioned that faulty technic in the use of local anesthesia may be followed by postoperative complications, such as infections, sloughs and necrosis-all of which are avoidable. These result from the use of hypotonic salt solutions, surcharging the tissues with solutions, excessive use of ephedrin or epinephrin, or by injecting inflamed tissues.

It is generally supposed that highly neurotic and excitable persons are not good subjects-even poor risks-for local anesthesia. But if a patient be intelligent, even though their nervous tension is high, they are quite as tractable as those of tranquil temperament. It is in the nervous type of patients that pre-operative medication is most serviceable. Crile says: "Under the influence of morphin and scopolamin no one is a coward, no one is brave, everyone is in a neutral state."

Obviously, it is essential to the successful performance of surgical operations under local anesthesia that the operator be familiar with the details of the method, possess a thorough knowledge of the anatomy, particularly the nerve supply of the parts, and also have acquired a

refinement of surgical technic approaching perfection.

I shall not burden you with a detailed review of the nerve supply of the organs under discussion further than to quote Hunt's* brief description, which is as follows: "Surgery of the head lends itself particularly well to local anesthesia. The tale is that the nerve supply runs from the base toward the vertex. The branches anastomose freely, so that the blocking of one branches a complete or partial anesthesia of only a limited area. The serve supply to the anterior, and most of the lateral portions of the scalp, is derived from the fifth cranial nerve, while posteriorly the nerve supply is derived from the second and third cervical nerves. The conterior portion of the scalp and forehead is supplied by the suprattochlear and infra-orbital nerves, which are terminal branches of the ophthalmic division of the trigeminus. The temporal region is supplied by the zygomatico-temporal nerve, a branch of the me division me third or ma Surgery of the Hea Febinger, New York, 1926. maxillary execond division, and the auriculo-temporal nerve, which is a branch of the third or mandibular division of the fifth nerve. That

"Phase Surgery of the Head, Face and Neck." H. Lyons Hunt, Lea and

portion of the scalp immediately behind the ear is supplied by the great auricular from the second and third cervical nerves. The posterior portion of the scalp is supplied by the great occipital from the second and the lesser occipital from the second and third cervical nerve."

It would seem from Mueller and Dahl's conclusions that the sphenopalatine ganglion has been ever exploited. They have demonstrated histologically that it is a purely sympathic ganglion. If this be true we must necessarily revise our views regarding the effect of cocain applied to this region, because we are dealing with branches of the second division of the fifth nerve, i. e., the sensory nerves surrounding the ganglion, and it is these, then, that are anesthetized.

PRE-OPERATIVE MEDICATION

When drugs are injected into the blood stream preliminary to local anesthesia, the combined method is termed narco-local anesthesia. The preliminary administration of morphia and scopolamin serve to minimize the anxiety complex, and also are useful in preventing physic shock; but when given for the purpose of preventing pain, the use of opiates is certainly not in accord with the best surgical practice, because we know that semi-conscious patients in many respects do not behave so well as those fully conscious. I now rarely use more than one-sixth grain of morphin, nor larger doses of scopolamin than one-two hundredth grain, administered one hour before operation. Pantopon is used by some surgeons in preference to morphine for the reason that they believe there is less excitement and the tendency to nauseate not so pronounced. Personally, I have not been able definitely to confirm this assertion. Furthermore, it has been conclusively proved that the administration of these drugs does not lessen the amount of local anesthesia required, at least in operations on the head; nor have I found that the combination of morphin and magnesium sulphate has any distinct advantages over morphin and scopolamin. Undoubtedly, preoperative administration of the drugs already referred to are of considerable value when used in conjunction with general anesthesia, as they seem to act synergistically and therially reduce the amount of inhalation anesthesia required in sugical procedures. Moreover, those not familiar with the local method of anesthesia, or whose surgical technic is faulty, are inclined of employ large doses of opiates, too often, I think, huge enough to be dangerous. I am convinced that the general symptoms resulting from preliminary over-drugging are frequently the real cause of the appearance of distressing symptoms which are attributed to the toxic effect of cocain. And we must not be unmindful of the fact that the excessive use of these drugs is attended with one of considerable controversy.

The popularity of cocain, even as a topical anesthetic, has been

threatened as a result of its toxic properties. Doubtless, this drug has been responsible for a number of deaths, but I think it probable that other influencing factors in many instances may have been disregarded. Many of the recorded reports of death from cocain poisoning rest on rather slender evidence that this drug per se was responsible. But we must admit that some persons are idiosyncratic to the drug. From my own experience I believe its toxicity has been greatly exaggerated, and also that it is quite likely a larger percentage of deaths attributed to local anesthesia are reported than those resulting from general narcosis.

Cocain is the most effective of all the drugs used for local anesthesia, but as it is also the most toxic, injections of this drug, except in small amounts of weak solutions, is viewed as a dangerous procedure, consequently its use is now almost entirely limited to topical applications to mucous membranes. Furthermore, since novocain is almost equally efficacious when injected subcutaneously, and is practically free from toxic properties, this drug has superseded all others. In brief, novocain stands in the forefront and approaches the ideal, and when properly administered, large quantities may be used when necessary to produce satisfactory anesthesia in major surgery. For single operations, Allen has injected in solution 38.4 grains; Farr, 19 oz. of a 0.5 solution (equal to 45 grains); and Babcock, 12 oz. of a one per cent solution (equal to 60 grains) without untoward symptoms.

We know that the toxicity of any drug used for local anesthesia largely depends on the concentration of the solution, amount used, and the rapidity with which it enters the blood stream.

PRELIMINARY PREPARATIONS

Patients should enter the hospital the night before operation, and be subjected to complete physical examination. An enemy of normal salt solution is advisable, and to assure rest, a sedative hould be administered. The diet need not be greatly restricted, and fluids may be given before, during and after the operation.

Strictly speaking, local anesthesia meets temporarily to remove sensation by bringing a solution which hossesses anesthetic properties in contact with the sensory nerve elements, and is accomplished in several ways, as follows:

1. By topical (direct) applications to mucous membranes.

2. Infiltration anesthesia This method is sub-divided as follows:

(a) Direct, the inaction of a solution into the tissues to be operated on

(b) Indirect then the solution diffuses beyond the infiltrated area poliucing what may be termed secondary anesthesia.

(c) Circuminjection, the injection of a solution surrounding the ates to be operated on. (d) Regional, the production of anesthesia by blocking the Oxditized by III

nerves which supply the field of operation. This is accomplished either by injecting the solution adjacent to the nerves (perineural) supplying the field of operation, or by introducing the anesthetic solution beneath the nerve sheath (endoneural). At present, conduction anesthesia is not often employed in surgery of the head; but the method is becoming more and more popular as its scope of applicability broadens with improvements in technic.

METHODS OF PREPARING SOLUTIONS

The potency of cocain is greatly lessened by boiling. To sterilize cocain solutions, the method recommended by Mikulicz is satisfactory: To the cocain, which is placed in a sterile bottle, sufficient alcohol is added to cause the drug to deliquesce, the bottle is then closed with cotton and kept until the alcohol evaporates. Boiling solutions of novocain has proved a satisfactory method of sterilization, as it is not materially altered by this process, nor are the vaso-constrictor drugs.

All solutions should be freshly prepared.

Some authorities advocate the addition of sodium chloride or Ringer's solution to novocain, which seems to lessen the sensation attending the injection of the solutions. It has been convincingly shown that the addition of ephredrin or epinephrin to solutions of local anesthetics has manifold advantages, to-wit: By materially controlling hemorrhage, prolonging and potentiating the anesthetic effect, decidedly lessening the toxicity by limiting and retarding absorption. Ephredrin seems to have several desirable properties not possessed by epinephrin, namely, stability, freedom from irritating properties, less effect on the blood pressure, and decreases the toxicity of the drugs used in combination.

*Ross, in concluding a recent article, contrasts the two drugs as

follows:

"1. Ephedrin and cocain do not act synergistically on the blood pressure like epinephrin and cocain.

"2. Ephedrin does not increase but decreases the toxicity of

cocain."

We know that inflamed tissues are more sensitive than those which are normal, and also that it is not permissible to inject tissues which are diseased, so that these required recuminjection, combined, when

possible, with regional anesthesia. The mucosa of the mouth, pharynx, larynx, trachea, anterior portion of the septum and nasal chambers have little pain sense. Bone, cartilage, brain tissue, and the esophagus are insensitive. The superior and posterior portions whe nasal septum and nasal cavities are highly sensitive, as are perioteum, the mucosa of the maxillary sinus, frontal sinus, tympanic cavity and dura.

*Ross, E. L.: Archives of Otolaryngology. 5:6. June, 1927. When possible patients should be placed in the recumbent position during the application of local anesthetics, and throughout the operation. For consillectomy, intranasal sinus operations and many surgical procedues on the larynx, the sitting or semi-recumbent postures are

OPERATING ROOM

Patients should be made comfortable while on the operating table by additional pads or pillows. The atmosphere should be cheerful, but quiet. The demeanor of the surgeon should be such as will impart confidence, which in turn will have an inspiring effect as well as infusing a spirit of courage, which undoubtedly aid in allaying the patient's anxiety. And it is also comforting to subjects who are more or less nervous to assure them that gas will be given as an auxiliary should they at any time experience pain. Haste, and failure to manipulate the tissues with gentleness, are to be avoided.

TECHNIC

To describe the technical steps even of a few of the important operations on the ear, nose and throat, would carry us far beyond the allotted time and scope of the present discussion; therefore, this part

of the subject must necessarily be treated in a general way.

It is important that the operator be provided with good syringes and an assortment of sharp needles, ranging in length from one-half to three inches and from eighteen to twenty-six in gauge, and also that all cutting instruments be superlatively sharp. Anesthetic solutions should be slowly injected into the tissues either as the needle is advancing or during its withdrawal—a precaution which obviates the danger of an intravenous dose. By aspirating before the introduction of the solution, it is easy to determine if the needle has entered a vessel.

The advantages of local anesthesia in many operations quite commonly done under general, are convincing when performed by a skilful operator whose experience with the local method of anesthesia has

enabled him to master the technic.

The following is an incomplete list of operations on the head and neck of adults, which I think can be successfully, and most instances preferably, done under local anesthesia: External operations on the frontal sinuses, radical operations on the maxillary sinuses, tracheotomy, thyroidectomy, laryngectomy, ligation of the figular vein, mastoidectomy, perisinus abscess, thrombosis of the sigmoid sinuses, subtemporal decompression, and otitic brain abscess. But it would be incorrect to say that inhalation anesthesia is not in some types of cases the method of choice in the operations above enumerated.

Finally, considering all the accertain facts, it is clear that the local method of anesthesia for many operations on the ear, nose and throat, is unrivaled, and it is the obvious duty of every surgeon, whether general or special, to familiatize himself with its advantages and technic. And taking a prophetic plance into the future, I predict with confidence, as we follow the improvements in technic as they are being evolved, and note the broadening of its scope, that ultimately, practically all operations on the head and neck will be done under local anesthesia.

Discussion opened by Dr. Eugene R. Lewis, Los Angeles:

I take enjoyed this very much. I am going to try to make my discussion as short as I can. I believe the use of the term "local

anesthesia" is apt to carry with it a feeling that both Dr. Lewis of Santa Barbara and I object to, and that is that the local part of it is inadequate. I think the most important part of our problem in attempting to prepare to do something surgical to a patient is not local. We may have a patient who is capable of facing the situation with apparent equanimity, but I think the most important part of the situation is the controlling of those uncontrollable things. No matter how brave a patient may be, there are certain things beyond his control. I think it is our duty to meet the awareness of the patient first. For that reason an operation done under so-called local anesthesia has as its highest point the attainment of a separation of the patient from his awareness. If he feels pain, that is one thing; but if it results possibly from fear, that is quite another thing, and I think it is an important thing for the physical welfare, for the outcome of the operation and the after results, so that my first point is the elimination of the patient's awareness.

Now, in fact, most patients who are properly narcotized generally are capable of co-operating on command to an adequate degree. If one says "Open your mouth" two or three times, they will open their mouths, yet they are perfectly unaware of what they are doing. It is a very limited remnant of consciousness, but it makes no impression on the patient and leaves no trace in the memory of the patient. For the purpose of preparing to meet that proportion of our problem, I think we should use an adequate dose of morphin or scopolamin. I have no reason to believe that morphin or scopolamin carry any element of danger. I have used in one dose one-twenty-fifth of scopolamin and a half grain of morphin in many cases. I don't always use that much, but I think that is more than enough for any contingency, and I have never seen any disquieting circumstances. I have had my attention called to the fact that the patient apparently was breathing shallowly; have had those things pointed out, but they are perfectly all right. Don't let us be stampeded in that or apprehension by observing something which is more or less to be expected.

The preparation of the patient before this I think is very important.

If a patient is in good physical contion, I do not think we should disturb their normal sequence of their starvation or drastic purgative or any great interruption of their normality. I do think that a saturation of a patient with a liquid inundate and reducing the urine to probably ten or twelve during the preceding two or three days is apt to be a distinct advantage, both during and after the operative procedure, but I don't like to do very much else before that. I like to avoid the possibility i running into what I have encountered on more talk and do things manifestly the excitation stage, and in my experience one can excitation stage by fractional doses, sometimes very greatly have come to believe that the most advantageous use of morphin

and scopolamin is in one single dose, adequate to go down through the stage of excitation and into the stage of narcosis, just as one should attempt to apply ether, not lightly, carrying into the stage of excitation, but going through the excitation stage into a stage of full narcosis and relaxation. I think that some of the criticisms which have been properly expressed by those who have had that experience have their origin in a rather gingerly use of their hypodermics. The youngest child I have ever given is three and one-half years. I gave that child two different hypodermic narcoses, each time giving a full quarter of morphin and one-seventy-fifth of scopolamin in one dose. There were no disquieting symptoms; had less than full narcoses, but perfect lack of disturbance of the operator on the part of the child, which is all we wanted. That I think is perhaps not consistent with the ideas of most people regarding hypodermic doses of morphin in children; but I believe it is consistent with the fact that children take relatively more morphin than adults, and that dose at three or four years of age is not going to subject that child to any danger at all.

So much for the general situation. Locally, I think of meeting the situation in at least three different subtitles. One is the preparation of the surface to get the greatest advantage from topical applicaion. The effect of scopolamin or atropin or any number of drugs is very advantageous in application to the head because it brings drying as a by effect. Taking advantages of the fact that the mucosa is dry, one can use one drop of ten per cent solution of cocain and get tremendously wide effect on the surface, and I feel that a complete, deep anesthetization of the pharynx in intensity can be obtained by this ten per cent cocain, not more than six drops, three on each side, if properly applied topically, one drop at a time. That does not run way with the mucous and saliva, because the mucosa is thoroughly dry, and you get the maximum effect of the cocain as it is applied.

The next thing is the matter of abolishing or attempting to minimize untoward reflexes; whether in the eye with the larynx or in the pharynx, it is desirable to break the leg can undesirable reflex and that can be done in the essential end of the reflex by sufficiently intense local anesthesia at the surface, of cocars. After that I prefer one-tenth of one per cent of cocain, although agree with the popular feeling against cocain by using novocain instead.

Dr. P. C. Means, Santa Barbara:

One thing you will optice as you go around watching different operators. It is how the nature to attempt to pass the buck. We rely recent trip to Chicago and the Mayos, and I think the principal criticism I would make of those hurried men is that they don't take into consideration the varying psychology of the patient,

and when you use local anesthesia you have to do that if you are going to get the best results.

The old prophets of medicine that we look back on and think of with admiration understood their patients. They knew when to cuss them out and when to reassure them, and I think that it is very important in our local anesthesia to take time to study the patient and to give them the mental attitude that will make them look back on their local operation with the least regret and retain their admiration for the surgeon and their belief in him. I think that is the thing we should look forward to in successful work.

Dr. John H. Harter, Seattle:

There are some things which I think have worked against the popularity of local anesthesia and most have been mentioned, but I would like to re-mention two or three of them. One is the fresh boiling of solutions. I remember before I began this that very frequently in throat work the patient would have pain upon opening the jaws for maybe a long time afterwards and since I have been boiling the solution freshly, I have never had a case. Some sort of an organic chemical change must take place in the novocain. At least I know that is true in my experience.

One extremely unfortunate thing is the similarity between the terms cocain and procain. I am sure that is accountable for some deaths that have occurred under local anesthesia. That can happen in two ways. For instance, in a little hospital a head nurse may have control and they have both cocain and procain tablets. How easy to read the wrong label. That should never be allowed. In one hospital I use, a small one, we have no procain tablets, excepting the big three grain tablets—that is the only tablet. Everything else comes in solution.

In solution, when you have the two colutions on the table, the operator may want a syringe full of protain and get cocain, and for that reason the one solution or the other, usually the cocain, should be colored some definite color as soon as it is placed on the table.

Many of these deaths from local anesthesia, most of them, I have been able to find are in throat currery, usually tonsils, and the important point to keep in mind there is that all injections of tonsils should be with a glass syringe. It is very difficult to tell whether you are in a vein with the all metal tringe. With good attachment, before injecting the solution, you can have back on the piston and determine definitely whether in a very or not. That is extremely important in throat surgery.

One other plase is that we hear a great deal about patients unsuited to local about hesia, but we don't hear much about surgeons being unsuited out some of them are not of the right temperament. A clock should be part of the armamentarium, and the surgeon should wait the proper time and not depend on how he feels about it.

Dr. Frank E. Detling, Los Angeles:

I think Dr. Harter has brought out an important point relative to surgeons using local anesthesia and their inability to carry on under local anesthetics. I had the experience of working in a hospital some years ago where there were ten different surgeons, all with their own clinics, and I, as resident, could observe the ability of some men to have control of their patients, almost hypnotize them, and others could forget the patient and wonder why they didn't obey. I couldn't always express my opinion, but I had it about the neglect of the surgeon for the patient, forgetting the psychology.

No doubt but local anesthetics are being used more and more. I was quite surprised on a trip to Europe how little they are used in Great Britain. Practically all tonsils are still being taken out with general anesthetic. I think we will have to write some papers and

educate them as to the value of local anesthetics.

Dr. Carl C. Cowin, Los Angeles:

About eleven years ago I was interne at a hospital where Dr. Lewis operated. One of the first cases I saw was a local mastoidectomy. It was, as I recall, a case of pneumonia and a question of how to operate, and Dr. Lewis and Dr. Farr decided to operate under local. Dr. Lewis did the operation. The patient from the time he started until they got through hardly made a murmur, and there was no electric engine used at that time. He used the ordinary mastoid instruments around the ear and I don't believe there was any pain.

There are one or two things that have been carried to excess in medicine, and one is the preparation of the patient. I find so many patients are told to go home and take a big cathartic the day before. I don't think it is at all best or necessary. If they are themal, it keeps them up the night before; they are restless and it doesn't allow them to sleep.

The doctor mentioned using pantopon. It was used a great deal in Dr. Lewis' clinic in Minneapolis. It is given rather more frequently than morphin because morphin occasionally makes a patient sick, no matter what dosage you administer. Exprephrin does not usually cause the nausea that morphin does.

In preparation of patient for operation under local, they should have plenty of sugars before and there will be less difficulty with nausea. I want to lay stress on the fact that I have seen Dr. Lewis do a lot of work under local, on mastoids as well as other things, and it can be done with absolute ease to the patient, and they will tell you afterwards that it ind not hurt them.

Dr. F. W. Hilscher, Long Beach:

I would like to mention one or two little things that I have been doing for a ong time. Many years ago, when we first began the use of cocain cay thirty years ago, there was a great deal of apprehension about the danger of using the cocain, but we gradually overcame that.

of cocabout

However, we would frequently have some evidences of shock, some sweating and fainting occasionally, but very rarely anything serious happened. However, one time I began to use strychnin in one of those cases that fainted, and I found that it seemed to work well, and ever since that I have used sulphate strychnin by the mouth, about a twentieth of a grain, not less than a thirtieth, just a little before I use the cocain, and I have noticed that whenever that was done I don't think I ever had any evidences of cocain poisoning when I used the strychnin. Occasionally I would notice that I had forgotten it, and evidences would appear and I would give the strychnin and in just two or three minutes that would pass off. I think that is a very valuable thing and I would commend it to your attention.

There is another thing about the use of H.M.C. I have never been a very great admirer of morphin, and I think I am probably a little prejudiced against it. Sometime ago I began using the H.M.C. without the morphin, the scopolamin. I haven't used it long enough, however, to tell for sure, but I think that one can omit the morphin and you will get the quieting effect of the scopolamin without the possible bad effects which you might get sometimes from the morphin. I allude, of course, to the drying up of the secretions and interfering with various things which morphine might do.

Dr. Lewis, closing:

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I have nothing more to add except to thank the members for their discussion of this paper.

Dr. Mellinger: The next paper is "Inflammation of the Nasal Accessory Sinuses as Revealed by the Roentgen Ray." I don't know any place where more work is being done and has been done in the past than at Stanford Hospital, San Francisco on this particular Sigitized by Illinois College of Optometry thing, and it is indeed a great pleasure to have of. Newell come down

Inflammation in the Nasal Accessory Sinuses, As Revealed by Roentgenography

By R. R. Newell, M. D., San Francisco.

I think you will all agree with me that diagnosis of sinus disease is not an easy matter. Much of the difficulty of sinus diagnosis arises out of a desire to be very precise. If we are to apply therapeutic measures intelligently, especially surgical measures, we must know just which of the various sinuses is diseased, the nature of the disease, its severity and its chronicity, and also must be able to make an estimate of its prognosis if left alone.

Roentgen examination can't answer all those questions, but it can answer some. In its essentials the roentgen problem is really very simple. We have a lot of holes in the head which in health are full of air. Fluid, polyps, cysts and thick mucous membrane intrude themselves on these air spaces and so become visible by roentgen ray. So one has merely to decide: Is this sinus full of air? If not, what is displacing the air? If all the air is displaced it may be fluid or soft tissue swelling (or tumor). Fluid and soft tissue produce shadows of the same density. If only part of the air is displaced, then the intrusion may be free fluid which will shift if you turn the patient on his side, or may be a polyp or a cyst, which are recognized by their spherical form; or may be thickened mucous membrane which is recognized by its marginal distribution.

Good roentgenography is, of course, prerequisite to good kinus diagnosis. I do not wish to insist on our own technic, but vio confess to a conviction that a single film will hardly suffice. The needs projections in several directions. Also that stereoscopic examination is worth the extra cost of making and the extra time in viewing. Also that patients should be sitting upright rather that lying prone, lest we overlook sinuses only half filled with fluid.*

*Foot Note:

Our present standard sinus teonic calls for three sets of stereos:

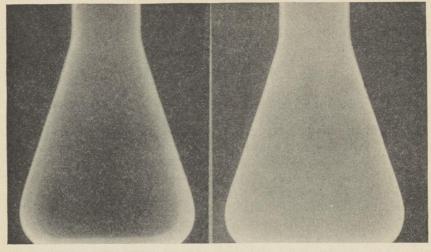
1) Patient sitting, forehead gainst a vertical Bucky diaphragm. The central ray passes horizontally through the base of the skull. The target is in the midsagittal plane of the pather's head and the stereo, shift is made up and down so as not to disturb this eight temple against the vertical Bucky.

2) Patient sitting, light temple against the vertical Bucky.

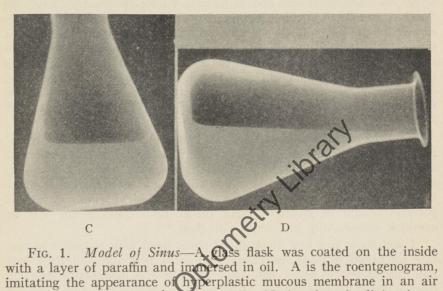
3) Patient Jyong on left side, nose and chin against vertical casette-tunnel (Waters' position) stereo, shift being made in the mid-sagittal plane as in 1).

Exposure factors are, with double screens, 80 Kv. crest voltage, 10 ma. (fine focus radiated tube) 40-inch distance 30 seconds for 1) and fifteen seconds for 2).

For 3) Wilsout Bucky 25-inch distance may give good films, and the time will be about 12 seconds.



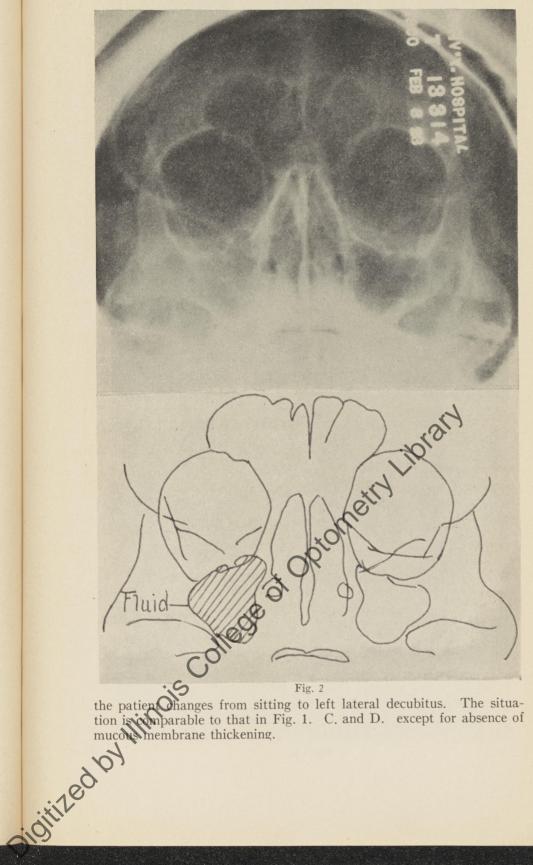
B



imitating the appearance of hyperplastic mucous membrane in an air filled sinus. B shows it filled with oil. Notice that the lining is no longer discernible. So in fluid-filled maxillary sinus, any thickening of the lining will nothe discerned. C shows it only half filled with oil. D shows the shiping of the fluid when the object is tipped. These two demonstrate the usefulness of roentgenography with horizontal ray, i. e., with the film vertical.

that it is full of fluid, but must admit the chart it is soft tissue (not bone). Compare Fig. 1. B.

Shifting Fluid Levels in Maxillary Sinuses. Both maxillary shuses are a third full of water. Note the shifting of the water when



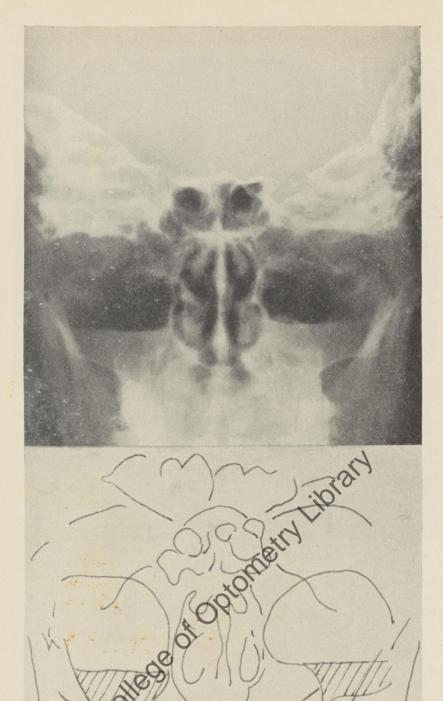
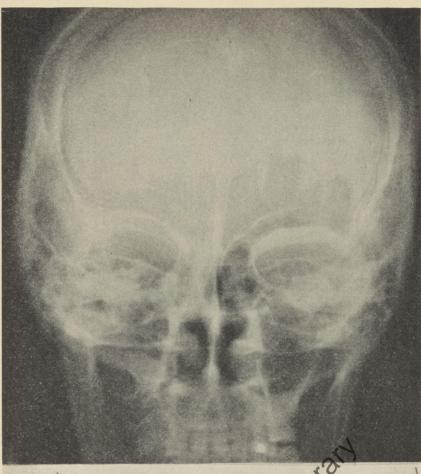


Fig. 3A

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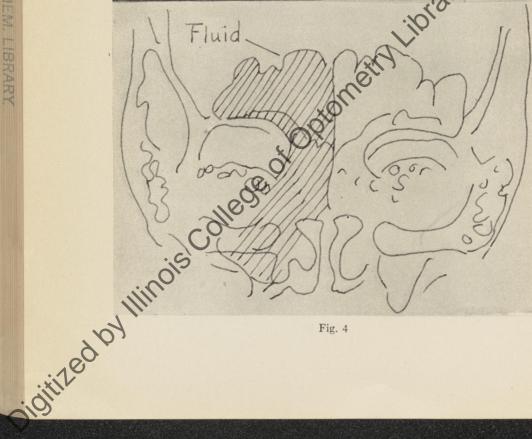


Fig. 4

Fig. 4. Unilateral Empyema. All the sinuses on the left are completely filled up, presumably with fluid. Compare Fig. 1. B.

Fig. 5. Shifting Fluid Levels in the Frontal Sinus. The left frontal sinus is two-thirds filled with fluid (pus). Notice the shifting of the fluid when the patient changes from left lateral decubitus to a sitting posture. Compare Fig. 1. C. and D.

Fig. 6. Left Maxillary Half Full of Fluid (muco-pus). A second roentgenogram taken two minutes later, after patient has blown his

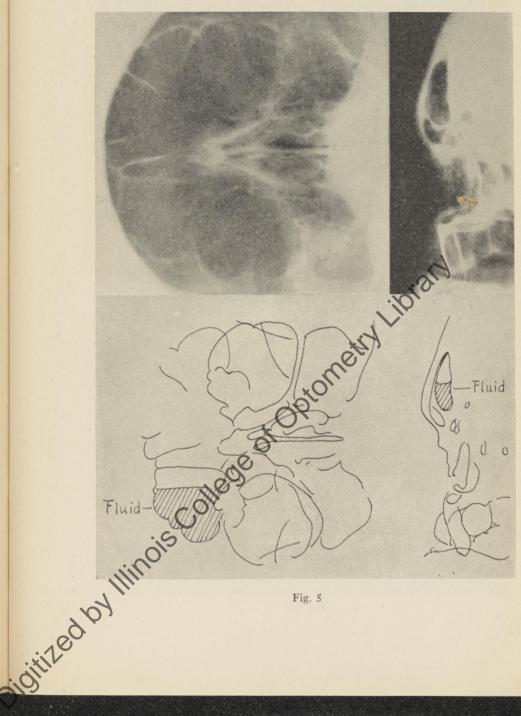
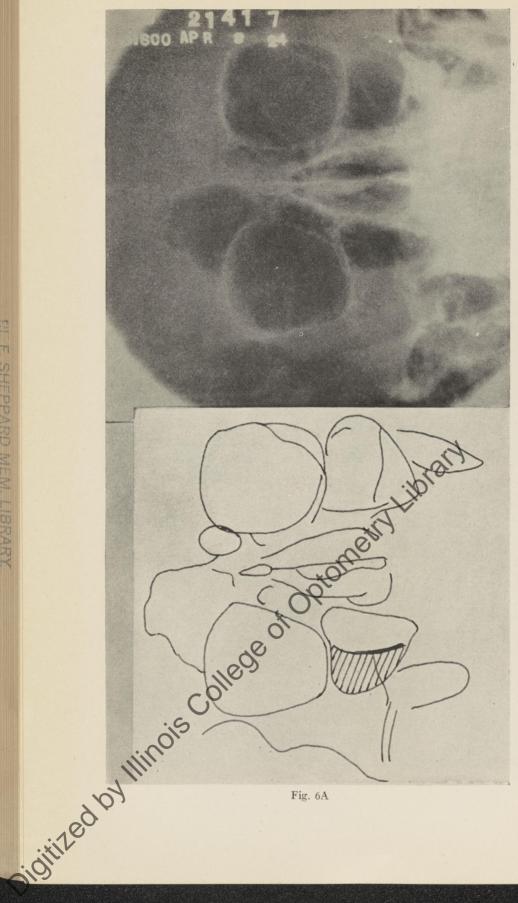
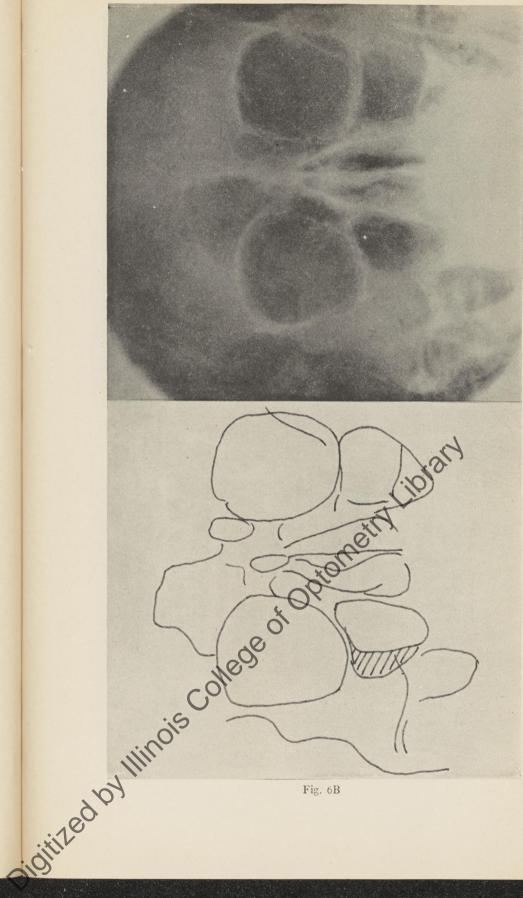


Fig. 5







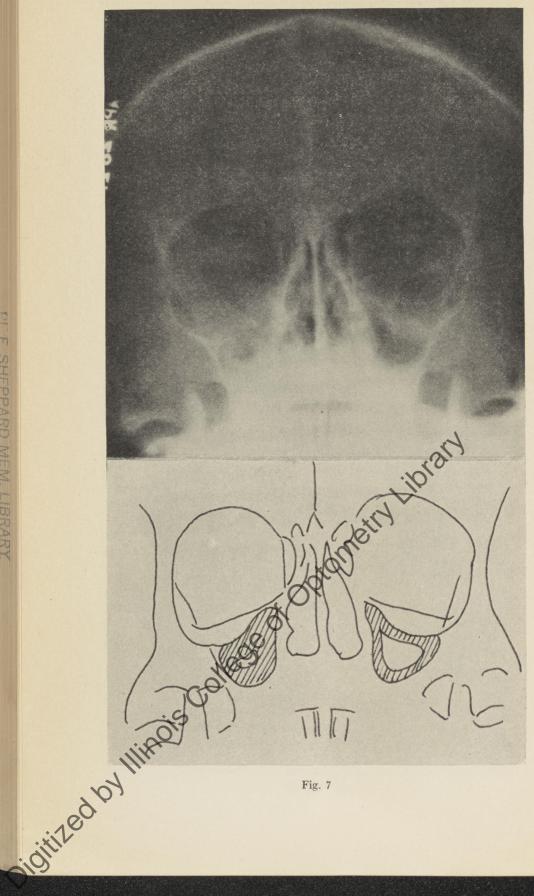


Fig. 7

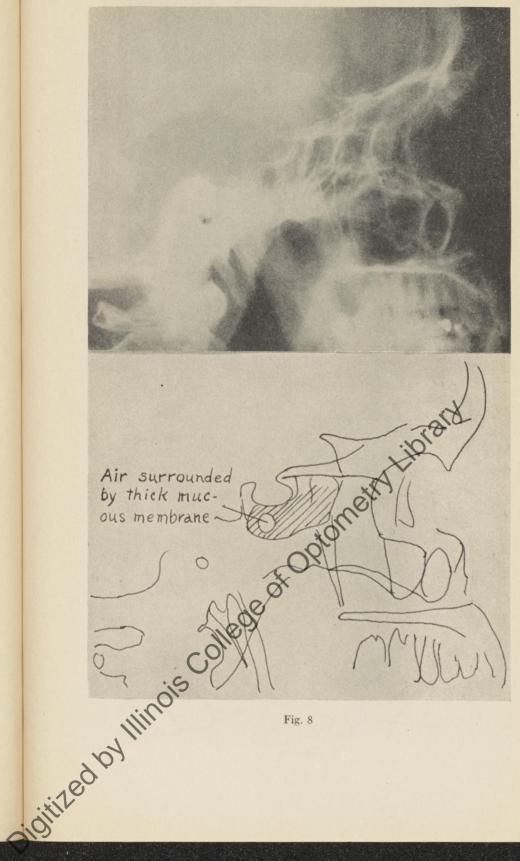


Fig. 8

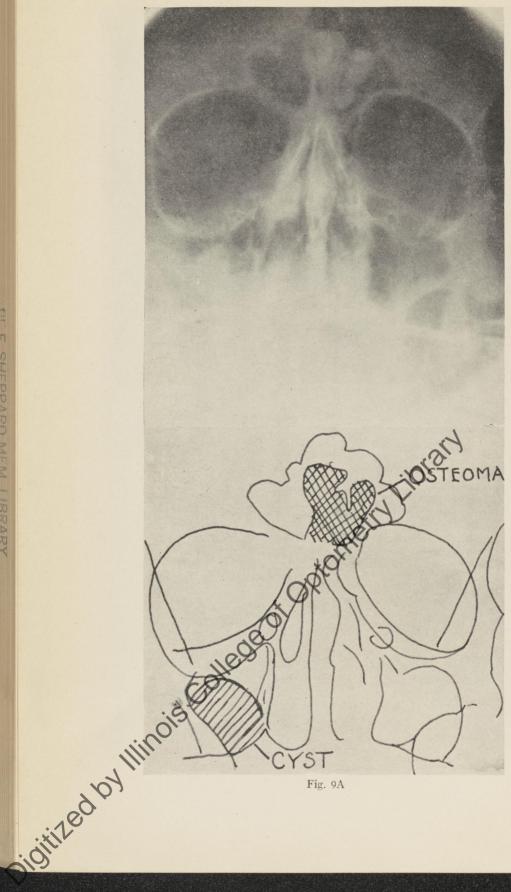


Fig. 9A

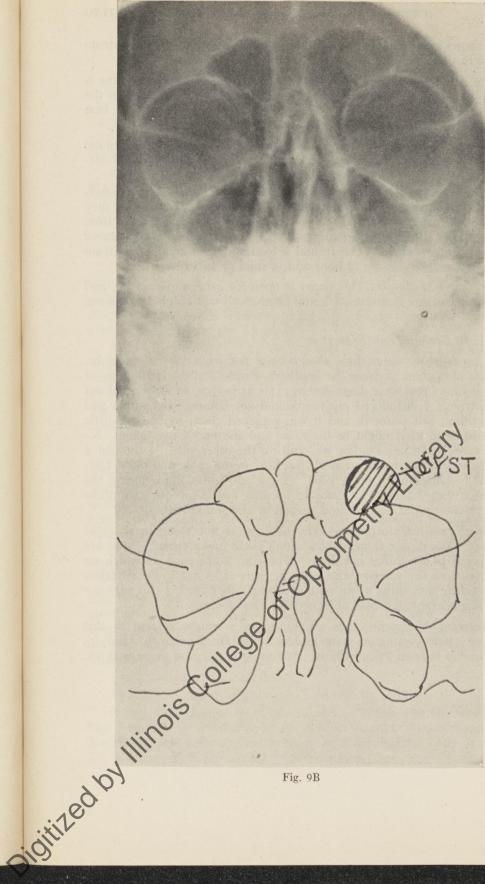


Fig. 9B

nose, shows very much less fluid than before. What was in the antrum is now in the handkerchief.

Fig. 7. Mucous Membrane Thickening. The mucous membrane is about 3 mm. thick in the left maxillary and about 9 mm. thick in the right one. Compare Fig. 1. A. This patient is 10 years old. Note that the frontal sinuses are undeveloped.

Fig. 8. Mucous Membrane Thickening. The mucous membrane in the sphenoid sinus is very thick, leaving only a small central airspace.

Fig. 9. Polyps or Cysts. Such rounded intrusions into the sinuses usually prove on aspiration or operation to be cysts. Sometimes they are proven to be polyps. In one instance a granuloma grew up from the root apex of a bicuspid tooth to give a similar roentgen appearance in the maxillary sinus. The frontal osteoma gives a good comparison between roentgen density of bone and of fluid or soft tissue.

President Mellinger: This paper is open for general discussion, and if anyone has any questions, I know Dr. Newell will be glad to answer them.

Dr. H. B. Graham, San Francisco:

A great many times these shadows are not what they seem to be. I had a man come in from the Southern Pacific Railroad with two of these shadows that were diagnosed as cysts or polyps, so we washed out one antrum. I introduced my needle and got nothing; put air in and got nothing; put water in and it was returned clear, so being a little confused as to what might be there, we had another Xtray taken. No shadow on that side; shadow was still on the other side. I thought I would sneak up from behind and I put him on the table and did a Luc-Caldwell operation to get a peek. I got no cystic fluid during the operation, but managed to make an opening in the mucous membrane at the highest point possible and peeped in and found nothing.

Dr. Newell: Unfortunately Dr. Graham is not alone in that experience. We do see things which aren't there undoubtedly. Men are very prone to see things not there there are some cases in which we feel that even the surgeon who looks in there is as apt to be mistaken in not seeing something as we were in seeing something. I can only say that imponderable invisible bjects don't cast shadows.

President Mellinger. This concludes the scientific session of this meeting. Before going in, I should like to ask Dr. Dunlap to stand up. Dr. Dunlap is from Jekin, China. We are glad for you to be with us.

Dr. Dunlap is fro

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BUSINESS MEETING

Friday, April 20, 1928

The annual business meeting of the Pacific Coast Oto-Ophthal-mological Society was called to order in the Recreation Center by Dr. William J. Mellinger.

President Mellinger: We will now have the business session. The first thing is the reading of the minutes.

Dr. Thomas: I move that the reading of the minutes be dispensed with. (Seconded.)

President Mellinger: All those in favor please say "Aye"; contrary; carried.

Under the head of unfinished business, the Secretary has some communications.

Secretary Hoffman read a letter about the 1st International Oto-Rhino-Laryngological Congress to be held at Copenhagen in 1928, and a second letter from Dr. Lynch.

President Mellinger: This Society sent \$500.00 to Dr. Lynch for the Mississippi flood sufferers last year. He was to be with us at our meeting, but on account of the flood he was unable to come.

Dr. Ralph Fenton is Chairman of the Western Sectional meeting of the Triological. I will ask him to make the announcement of the meeting.

Dr. Ralph A. Fenton: The members of the Pacific Coast Society are all heartily welcome to the meeting of the Triological. It begins promptly at nine o'clock tomorrow morning. We have a very long program of short papers, mostly case reports. We want to get through it and let everybody get out so they can have a little golf in the afternoon, but I extend a most cordial invitation beyon all to attend those sessions.

President Mellinger: Under the head inew business, have you anything, Mr. Secretary?

Dr. Isaac H. Jones, Los Angele. I think it would be a very good idea if we were to have a handsome representative at the Copenhagen meeting. I refer to the man on my right (Dr. Graham of San Francisco). He is going to attend and it is just a thought that unless it is out of order, I think that would be a very nice thing if he could go with proper papers and abbons.

I will make that as a motion.

Dr. Eugene Lewis, Los Angeles: Second the motion.

President Dellinger: It is moved and seconded that Dr. Graham of San Francisco be a delegate of the Pacific Coast Oto-Ophthalmological Society of this international meeting at Copenhagen. Any remarks? All in the American All in the San Francisco be a delegate of the Pacific Coast Oto-Ophthalmological Society of this international meeting at Copenhagen. Any remarks? All in the San Francisco be a delegate of the Pacific Coast Oto-Ophthalmological Society of this international meeting at Copenhagen. Any remarks?

Secretary Hoffman: There is one suggested amendment by Dr. Otto Barkan and the Executive Committee has also suggested two amendments. These amendments have to be read at this meeting and have to be sent to each member of the Society in print or typewritten form at least six weeks preceding the next meeting in order to be acted upon and become amendments to our constitution and by-laws.

(Read the form of amendment suggested by Dr. Barkan.)

This must take form as a concrete amendment if it is to be acted upon a year from now.

President Mellinger: I will read the minutes of the meeting of the Executive Committee.

MINUTES

The regular meeting of the Executive Committee was held in Room 251 of the Hotel Carrillo, all members of the Committee being present, Dr. Mellinger presiding.

As a first order of business Dr. Pischel moved that the action of the Society in the matter of the \$500.00 contribution to Dr. Lynch's flood relief be endorsed by the Executive Committee. Dr. Carroll Smith seconded this and it was passed.

Dr. Hampton moved that the audit of the Treasurer's report be accepted. Dr. Carroll Smith seconded and it was passed.

Dr. Hampton moved and Dr. Pischel seconded that Section 2 of Article III be amended to include the Territory of Hawaii and Alaska.

Secretary Hoffman: I will read Section 2 of Article III, which describes the members.

Just a geographic limitation. We have been receiving applications from Honolulu. Those men have no other affiliation. We are in the position also of receiving applications from the territory of Alaska. We thought it well, therefore, to amend this article to include those two territories and if the Society deem advisable we might further amend to include a greater geographical axea.

Dr. Hampton moved and Dr. with seconded a motion that the following amendment be made to the Constitution—a member in good standing for twenty years, or a member who for any reason has become incapacitated, on action of the Executive Committee may have his dues remitted from that time und such a disability be removed.

Dr. Carroll Smith poved and Dr. Hampton seconded a motion that the dues of Dr. Copeland Plummer be remitted for the ensuing year.

Dr. Pischel moved and Dr. Carroll Smith seconded that we recommend Salt Lake City as the next meeting place.

of Dr. Fenton for First Vice-President. Dr. Hofman nominated and Dr. Pischel seconded the name of Dr. Robert Hampton of Salt Lake City for president.

Carroll Smith nominated and Dr. Hoffman seconded the name

Dr. Hoffman nominated and Dr. Pischel seconded the name of Dr. Eugene Lewis for Second Vice-President.

Dr. Pischel nominated and Dr. Carroll Smith seconded the nomination of Dr. Hoffman for Secretary-Treasurer, the motion carrying with it the salary as denominated for the past year.

Referring to the flood relief, this money was appropriated at a general meeting and all matters of that sort are under the control of the Executive Committee, so we thought that action should be taken in order to clear our records.

(President Mellinger then concluded reading of Executive Committee meeting minutes.)

Secretary Hoffman: About the remittance of dues, there are some men we all like, such as Dr. Plummer in Seattle, who are totally disabled; have no earning power and there is no reason why we shouldn't retain them upon the roll of the Society until such a time as they are able to get back to work, or if they are never able to get back to work, still continue them in the membership.

President Mellinger: Under our present by-laws, remittance is merely from year to year.

Secretary Hoffman: The Executive Committee can remit the dues of any member from year to year, but you understand, meeting as we do so infrequently, we remitted the dues of one San Francisco member, and the next year, the Executive Committee, not having been reminded, forgot to do that and he automatically was suspended at the end of the following year if the dues are not paid.

President Mellinger: We now come to the report of mmittees. Then we will take up the action on this.

First will be the report of the Committee on Rubic Health and Legislation.

REPORT OF THE COMMITTEE ON PUBLIC HEALTH AND LEGISCATION

Mr. President and Members of the acific Coast Oto-Ophthalmological Society:

Herewith find the report of your Committee on Public Health and Legislation for the year 1008.

Unfortunately the Members of the Committee did not receive notice of their appointment intil March 10, 1928.

The report herewith presented is on the information that has been gathered since that time.

A consideration of the same will indicate that in the Pacific slope States the various public health matters having somewhat of a relationship to the professional work of the members of our society have on the

states, ship to

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whole been fairly well looked after. That does not mean that we measure up to a hundred per cent standard in these matters, or that every public health endeavor in which we as specialists should have a particular interest, has been adequately carried on. On the contrary, in every one of the states, and we take it also that in the province of British Columbia, there are items, more than one, where improvement in public health legislation could very well be instituted.

Appended to this general report are the substances of communications sent in by those of your colleagues who represented the different states. As has been stated, the brief lapse of time during which the committee has officiated has made it somewhat difficult for the members of this committee to do any extensive work. As a matter of record, however, it may be desirable to have this summary of public health work, since it may be of use to future committees of your society.

In order to avoid duplication of effort and to carry out a public health program for the Society, it might be better to appoint committee members for three year terms, the terms of one-third of the members expiring each year.

Respectfully submitted,

THE COMMITTEE ON PUBLIC HEALTH AND LEGISLATION

George H. Kress, M.D., Chairman, Los Angeles, California John C. McLoone, M.D., Phoenix, Arizona Arthur C. Jones, M.D., Boise, Idaho C. C. Allbright, M.D., Great Falls, Montana J. L. Robinson, M.D., Reno, Nevada Frederick A. Kiehle, M.D., Portland, Oregon Ed. LeCompte, M.D., Salt Lake City, Utak Fred Adams, M.D., Seattle, Washington

ARIZONA

Reported by Dr. John C. McLoone, Heard Builling, Phoenix, Arizone

1. Dr. McLoone, member of this committee, had a lye bill introduced, but through a misunderstanding on the part of the mercantile grocery interests, was lost in committee. It has a better prospect at the next session, because the grocery interests will probably not oppose it.

2. Arizona has an optometric board, and no changes were made in the law during the last legislature.

3. The Arizona Industrial Commission has covered the matter of protection of working then through preventions of industrial injuries in very good manner.

4. Arizona las good laws concerning the handling and sale of high explosives.

5. Arisona has laws safeguarding the granting of charters to schools of the healing art.

well regarded opposition, presumably led by Christian Scientists.

7. In regard to evils in state, county or municipal charity hospitals in Arizona no comment was made.

CALIFORNIA

Reported by Dr. George H. Kress, 245 Bradbury Building, 304 South Broadway, Los Angeles

- 1. California does not have any laws dealing directly with the sale of household lye, caustics, etc., although certain powers of the Pharmacy Board would give it the right to step in in these matters.
- 2. In the last Legislature several bills of a rather vicious type were introduced on the subject of optometry, which would have been inimical to the rights and privileges of ophthalmologists, but these proposed measures never got out of committee.
- 3. The California Division of Industrial Accidents and Safety of the Department of Industrial Relations, through order Number 10 of the general safety orders, requires certain guards on grinding wheels to serve in part as a protection against eye injuries; orders 1827-A and 1851-A and B provide for eye masks and goggles. Other general rules such as those in the various woodworks safety orders also apply in this regard.
- 4. In regard to laws regarding the sale and handling of high explosives, etc., these are incorporated in safety rules for gold dredges; quarry safety rules; general construction safety orders; tunnel safety rules and mine safety orders.

The Industrial Accident Commission in California State Printing Office leaflet Number 14114 gives the rules relating to the storage and use of explosives, and a booklet number 6163 of some 12 pages gives the mine safety orders; booklet number 39530, of some 12 pages, gives the quarries safety rules; booklet number 56170, at some 12 pages, gives the general safety orders; booklet 46730, of some 62 pages, gives the shipbuilding safety orders; booklet number 39122, of some eight pages, gives the woodworking safety orders booklet number 22642, of some 140 pages, gives the tunnel safety rules; booklet number 39374, of some 40 pages, gives the safety rules or gold dredges; booklet number 53233, of some 92 pages, gives the workmen's compensation insurance and safety act laws.

5. In Senate Bill number \$33, Chapter 152, which was signed on April 15, 1927, and went into effect on July 29, 1927, is a bill that threw safeguards around the incorporation of colleges and seminaries of learning, and among ther things it provides that in the incorporation of an organization for the purpose of conferring a professional degree there shall labe non-dividend paying capital stock and that the value of real and personal property used exclusively for the purpose of education much be not less than fifty thousand dollars in the case of any college of seminary of learning conferring degrees.

6. The matter of a basic science law is being agitated in California, and whelieve that this state, in common with other states where the

licensing of practitioners of the healing art is not done by a composite body, will have a basic science law within the next few years.

7. In California the unit of state organization is the county, and counties singularly or conjointly are called upon to provide county hospitals, etc., for the care of the indigent sick and injured.

Los Angeles County has just put in a separate osteopathic unit building costing over six hundred thousand dollars. In addition the County Hospital as a whole, under the general staff, will have within the next several years a ten million dollar county hospital building.

Many problems arise in conjunction with institutions of such size and in lesser degree are manifest through smaller institutions of similar intent.

IDAHO

Reported by Dr. A. C. Jones, Boise, Idaho

- 1. There are no laws governing household lye and caustics, except the necessary branding or labels.
- 2. Idaho has a separate Optometry Board. This Board operates under the jurisdiction of the Department of Law Enforcement. The law was enacted in 1907.

Optometry defined as follows: Chapter 94, Section 2155, Idaho Compiled Statute:

"Practice of Optometry defined: Any person shall be deemed to be practicing optometry within the meaning of this chapter who shall in any manner, except as provided in Section 2169: (1) Display any sign, circular, advertisement or device, purporting or offering to in any manner examine eyes, test eyes, fit glasses, adjust frames or setting himself forth as an optometrist, optician, optical specialist, eyesight specialist or directionist, with intent to induce people to patronize himself or any other person. (2) Who shall make in any manner a test or examination of the eye or eyes of another to ascertain the refractive or muscular condition thereof. (3) Who shall in any manner adapt lenses to the himan eye for any purpose, either directly or indirectly."

3. In Idaho the Industrial Accident Board has the power to make all rules or regulations for the protection of the working man. There are no special safety laws, this matter being left entirely up to the Industrial Accident Board. A severe penalty is attached for the failure to comply with any rule or regulation as promulgated by the Industrial Accident Board. Very little has been done in this respect in Idaho, because the legislature failed to make an appropriation for the carrying out of this safety work. All of the larger concerns maintain their own safety departments.

4. The Idaho law gives the municipality the authority of regulating the sale of high explosives within the city limits and for three miles beyond. The Idaho law positively states that all high explosives must be branded with the name of the manufacturer, the exact date of manufacture, and the per cent of nitro-glycerin or other high explosives contained therein. Heavy penalty is prescribed for the failure to adhere to this law. Sale of explosives of any kind to minors is prohibited by the Idaho law.

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- 5. There are no safeguards pertaining to the organizing or the granting of charters to schools in the state of Idaho, except where stock is sold, and then that comes under the jurisdiction of the Blue Sky Law. Idaho, being a small state, has not been bothered with this menace.
- 6. A Basic Science Law will be introduced in the next legislature, beginning January, 1929. This proposed bill has the endorsement of the Idaho State Medical Association.
- 7. The only trouble that has occurred in the Idaho hospitals lately has been the persistence of the cults, in their endeavor to practice in these institutions. The Supreme Court recently ruled that the cults could not be barred from the county institutions. We have two county hospitals in the state, therefore this is not much of a problem.

NEVADA

Reported by Dr. J. L. Robinson, 17 North Virginia St., Reno, Nevada.

- 1. Nevada, on March 6, 1925, passed an act to safeguard the distribution and sale of certain dangerous caustics and other substances.
- 2. In regard to the present status of recognition of optometric boards no comment was made.
- 3. Nevada's Industrial Commission has passed no special laws regarding the protection of men from injuries to the eye.

The Chairman of the Commission wrote and asked Dr. Robinson to inform him of anything new in the way of safety appliances intended to minimize accidents to the eyes.

- 4. The State Mine Inspector writes that there is no law regulating the handling of high explosives and detonation caps, other than one covering the storage of these explosives.
- 5. Regarding safeguards surrounding the granting of charters by the state to schools of the healing art, no comment was made.
- 6. Regarding the status of basic science lay for practitioners of the healing art, no comment was made.
- 7. Regarding the evils in state, county or municipal charity hospitals, no comment was made.

REGON

Reported by Dr. Frederick A. Kreine, Medical Arts Building, Portland, Oregon.

- 1. Chapter 238 of the laws of Oregon is an act to safeguard the distribution and sale of Crtain dangerous caustics or corrosive acids, alkalis and other substances.
- 2. The Oregon optometry Law is known as Chapter 285, Laws of Oregon of 1919. In a copy of the law issued by the Printing Department of the State of Oregon, there is an introduction on "Needs of Optometry Ourging postgraduate courses, conventions, etc. Contains also this lause: "Let us, therefore, as our sister professions of dentistry and medicine have done, unite that we may place ourselves on the same

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high plane that they enjoy, and enjoy even greater privileges of doing good for humanity, giving and preserving better sight, the privilege that does not fall within the scope of any other profession. Optometry will, when every man works for the profession, be the greatest of the learned professions, so let us hasten the day by uniting our efforts and working and doing as one."

The above is certainly an interesting foreword for a public document by a state board of examiners.

3. The Industrial Accident Commission of Oregon puts out a very splendid illustrated booklet of 40 pages, entitled "Work Accidents in Oregon," designed to aid in the prevention of industrial accidents.

From the fee table of the Oregon Industrial Accident Commission may be cited for purpose of comparison the following: Iridectomy \$75; enucleation of eye and subsequent treatment, \$50; removal of steel with giant magnet, and subsequent treatment, \$75; if the steel is not removed with the giant magnet, then the fee is reduced fifty per cent; sub-mucous resection of the nasal section, when authorized, \$75; removal of foreign body of the cornea, \$5; removal of foreign bodies embedded in the corneae of both eyes, \$7.50.

- 4. The only direct legislation which Oregon has concerning explosives is Chapter 2246, which makes it a misdemeanor to sell high explosives to children under fourteen years of age.
- 5. Regarding safeguards surrounding the granting of charters by the state of schools of the healing art no comment was made.
- 6. Regarding the status of basic science law for practioners of the healing art no comment was made.
- 7. It was not possible to obtain copies of the regarding public hospitals.

UTAH

Reported by Dr. Ed. LeCompte, Boston Building, Salt Lake City, Utah.

- 1. Utah has no legislation concerning the safeguarding of the distribution and sale of caustics and other dangerous substances.
- 2. The optometrists have a separate licensing board, and have made no special efforts to secure unfair advantages of ophthalmologists.
- 3. In the matter of industrial injuries there have been no special laws to protect working from eye injuries, etc.
- 4. Regarding high explosives and detonation caps, the only law makes it necessary to store such at a considerable distance from shafts,
- 5. In regard to the healing art schools there are no special laws, because they have no four year course medical colleges.
- sigitized by ill 6. Withing has been done as regards the basic science law.
 - There are few charitable hospitals in Utah.

WASHINGTON

Reported by Dr. Fred Adams, Roosevelt Clinic, Seattle, Washington.

- 1. The State of Washington has no law governing the sale of lye and caustics.
- 2. The State of Washington has an optometry law which is found in the laws of 1919, chapter 144, and also in the laws of 1921, chapter 7.
- 3. The Washington Department of Labor and Industries, through the Division of Safety, has covered the matter of protection of working men through prevention of industrial injuries in very good manner.
- 4. Washington has good laws concerning the handling, protection and sale of high explosives.
- 5. In regard to the laws safeguarding the granting of charters to schools of the healing art no comment was made.
- 6. Washington has a basic science law found in the laws of 1927, chapter 183.
- 7. In regard to the evils in state, county or municipal charity hospitals in Washington no comment was made.

*** * ***

President Mellinger: I want to say your President neglected the appointment of that Committee early enough for them to get any work done. I should like to suggest that the next president have that committee appointed early. There is a great deal of work for them to do and it takes them considerable time because of the great area coverd.

You have heard the report of the committee. What is your pleasure?

Dr. Eugene Lewis, Los Angeles: I move its acceptance

Dr. Kaspar Pischel seconded the motion.

President Mellinger: You have heard the motion. All those in favor signify by saying "Aye"; contrary; carried.

Next is the report of the Committee on Necrology.

Dr. Robert W. Miller, Chairman, Le Angeles: This is the unpleasant feature of this very enjoyable and helpful session that we have had. We have four cases of death or report. One came in since the beginning of this session—Dr. Nelson—and our notice is very brief.

"They are not dead he ones so calmly lying,
Where we leave flowers and swift, wistful tears;
The outer part them, alone, knew dying,
Their states travel, still, along the years.
"They was have given us the gifts of laughter,
Of deep affection, and of vivid mirth,
Leave toward us, on this hour, from the Hereafter,
Sound gently, by their love of us, to earth."

Dr. M.C. Nelson, of Eugene, Oregon, passed away November 26, 1926; death being due to cancer of the stomach. Dr. Nelson was a

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graduate of Northwestern University and practiced general medicine and surgery in Chicago for fifteen years. In 1920, after serving an interneship in the Illinois Charitable Eye & Ear Infirmary, Dr. Nelson located in Eugene, Oregon, where he limited his work to the eye, ear, nose and throat.

He was skillful and faithful in his relation to his patient, ethical with his confreres and invaluable in his community service.

It is with profound sorrow that we report the death of Dr. Frank Lee Barrows, a member of this society. It reminds us that in spite of our best efforts in combatting disease the grim reaper death eventually pays his visit.

Dr. Barrows graduated from the University of Colorado in 1898, and practiced in Moscow, Idaho, until compelled by illness to relinquish his work.

We have lost a member whose co-operation was needed and whose companionship we enjoyed, and while words are at best but empty things, we wish to record here our appreciation of his worth, and extend to his family our deepest sympathy.

Those of us who knew him were pained and shocked to learn of the death of Clifford H. Brooks, of Santa Ana, California, which occurred from angina pectoris October 18, 1927.

Dr. Brooks was born in Vinton, Iowa, June 12, 1885. Attended high school and received the degree of M. D. from Iowa State University in 1910. Was assistant in the departments of eye, ear, nose and throat at the university from 1908 to 1910. He took post-graduate work at Bellevue Hospital, New York, in 1913, and at the Chicago Polyclinic, Chicago, in 1914. He practiced in Cedar Rapids, Iowa, for some time, and in 1911 located in Santa Ana, where he practice Unitil near the time of his death.

He was a Fellow of the A.M.A. and a member of the California Medical Association, Orange County Medical Society, The Pacific Coast Oto-Ophthalmological Society, the Eye and Ear Section of The Los Angeles County Medical Society and the American Otological Rhinological and Laryngological Society.

Dr. Brooks was a man of pleasing personality, an earnest worker whose efforts and ability did honor to his chosen profession.

Dr. John Yeba Oldham, son of Dr. Wm. B. Oldham, was born in New Castle, Kentucky March 19, 1866. He was educated at Richmond College, Kentucky Graduated at the Kentucky School of Medicine, Louisville, Kentucky, in 1887. He was associated with Dr. Dudley S. Reynolds, of Dolisville, a noted specialist in diseases of the eye, ear, nose and throat for two years. Dr. Oldham located in the city of Lexington; Kontucky, where he practiced the specialties of the eye, ear, nose and Orioat until 1902, when on account of the health of his wife he removed to Los Angeles, California. In this latter city he practiced his profession until his death September 18, 1926.

He is survived by his wife, Grace Oldham, and her child. Also two sons by a former wife. Dr. Oldham was not only a specialist of rare ability, but a man of positive charm and culture, and a citizen of whom his adopted city could be proud. He was modest in demeanor, never seeking notoriety nor publicity in any way. In his death the medical profession sustained a real loss.

The above sketch is furnished by his uncle, Dr. J. M. Matthews, of Los Angeles, ex-president of The American Medical Association. He

refers to Dr. Oldham as his favorite nephew.

We in Los Angeles found in Dr. Oldham an able, upright member of our profession, and one we were always pleased to meet. He was a Fellow of the American Medical Association, and a member of The Pacific Coast Oto-Ophthalmological Society, The Medical Society of the State of California, The Los Angeles County Medical Society and The Ear and Eye Section of this Society.

We are grieved to be called upon to chronicle the death of these members, and recommend that these reports be spread upon the minutes of the Society and a copy in each case furnished the surviving members

of their families.

Let those of us who remain emulate the virtues and cherish the memories of those of our fellows who have passed on. The idea of better service to humanity seems to be gaining in prevalence. It is a pleasurable thought that we are doing our part. So let us not think of those we have lost for a time as dead, but living. A wholesome thought is expressed in these lines:

"Something starry, something bold, Eludes the clutch of dust and mold, Something that shall not wholly die From out the azure of the sky."

Respectfully submitted,

Roberted Miller, Chairman, Alliron T. Wanamaker, Lakoy Pugmire, W. Morse, Chas. M. Hosmer,

COMMITTEE.

President Mellinger: I wilk ask you all to rise for a moment of silence. (Members all rose to their feet.)

Dr. Fenton: I would have acceptance of the Executive Committee report, with thanks.

Dr. Wm. D. Donaher, Salt Lake City: Gathering from the report of the Executive committee before us, we are to judge that you are meeting with win Salt Lake City next year, and I just wanted to say, which I have full power to say, that it will delight the people of the great state of Utah to have you gentlemen and ladies all with us, and even those who only in spirit occupy the vacant seats now.

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We can promise you all of the great virtues which have been practiced in previous meetings and we will eliminate all of the vices. We can promise you that if John Harter wants an entire forenoon given to him for discussion of his paper, we will be glad to give it to him.

We will be delighted to welcome you all to Utah and hope you will come out in force and test our capacity for taking care of people, and we guarantee that when you leave there you will be able to say that you have been well done by your good and faithful servants.

Dr. Edward M. Neher, Salt Lake City: I want to endorse everything Dr. Donaher has said, because he always makes lots of promises, and they are always good promises, and we will fulfil them.

(Dr. Fenton's motion seconded by Dr. Donaher.)

President Mellinger: This is on the acceptance of the report of the Executive Committee. All in favor please signify by saying "Aye"; contrary; carried.

There is another committee report on the Pan-Pacific Surgical Congress.

Dr. Ralph A. Fenton, Chairman, Portland: The time is very late. and I won't take any more time than to say that the Pan-Pacific Surgical Congress was originally proposed to include delegates from all the countries bordering on the Pacific, and a large part of the work of such a congress would have to be carried on by people from the United States.

The invitation comes from the Governor of Hawaii and the Chamber of Commerce of the Islands. I am advised that various other congresses have been held in Hawaii along economic lines etc. This was to have been held in August of 1929. It has been decided, however, by the profession in Honolulu that it would be better held in January of 1930, and at that time I am advised that the Indian Medical Congress, which includes British Possessions in the Indies, Singapore, etc., Australia and New Zealand, will also be held in Honolulu. The question will come up for decision whether we shall send delegates to this meeting and/or as to the possibility of the recting of the Society for 1930 being transferred to Honolulu. The is a question for the meeting next year.

In the event delegates are to be selected, Dr. Mellinger has asked me to suggest various outstanding people in the various branches of our specialty, especially the oto-laryngologists, and he has asked Dr. Barkan to mention various ophthalmologists to take up various phases of our specialty and present them at Honolulu. That will be reported on at the meeting next year.

President Mellinger: You have heard the report of this committee.

: I move it be (Seconded by Dr. Pisch)

Notion carried in usual manner. : I move it be accepted and that the committee be (Seconded by Dr. Pischel.)

Dr. Ernest C. Wheeler, Tacoma: Would it be in order for me at this time to extend an invitation from the Puget Sound Academy and the members from Tacoma to have this Society meet with them at its pleasure?

Dr. C. Benson Wood, Los Angeles: I talked rather briefly with Dr. Peter, and he says he feels that he can reasonably assure us that in 1930 the Academy will meet on the coast, probably at Los Angeles, and I would like at this time to extend an invitation for this Society to meet in Los Angeles at that time so we may have a joint meeting with the Academy, also the Board will meet with the Academy at that time.

President Mellinger: It doesn't look as though we have run out of meeting places, does it?

We are now up to the election of the officers. First is the election of president for the ensuing year.

Dr. Pischel: I move nominations be closed. (Motion seconded.)

President Mellinger: It is moved and seconded that nominations be closed. Any remarks?

Dr. Wheeler: I take it that the nominations made in the report of the Executive Committee are referred to. I would like, therefore, to move that the Secretary be instructed to cast the unanimous ballot of the Society for Dr. Hampton as President.

President Mellinger: All in favor of Dr. Pischel's motion signify by saying "Aye"; carried.

All in favor of Dr. Wheeler's motion signify by saying "Aye"; contrary; carried.

The Secretary will cast the ballot of the Society.

Dr. Ralph Fenton is nominated for First Vice-President.

Dr. Pischel: I move that nominations be closed and that the Secretary cast the unanimous ballot. (Motion seconded.)

President Mellinger: All in favor, please signify by saying "Aye"; carried.

Second Vice-President—Dr. Eugene Lewis.

Dr. Pischel: I move that nominations be closed and the secretary cast the unanimous ballot. (Motive seconded and carried with same procedure.)

President Mellinger: The post painful one is coming-Dr. Walter Hoffman as secretary-treasprer.

Dr. Fenton: I move minations be closed. (Motion seconded and ried.) carried.)

President Mellinger: So you cast your own ballot.

Secretary Hofman: Here are the new members. These have all been endors men in their city or locality. They all have certificates from the Examining Boards.

Pischel Wohrmann, San Francisco Blair, Faris M., Seattle igitized by Stevens, Joseph, Los Angeles

Highee, David R., San Diego

Moose, Ray M., San Bernardino Halbert, Howard, Pasadena

Dayton, Glenn O., Los Angeles Remington, Paul A., Spokane

HONORARY MEMBERS

Dr. Pierce, of Chicago

Dr. Peter, of Philadelphia

Dr. P. C. Means, Santa Barbara: I move they be accepted.

Dr. Wheeler: Second the motion.

President Mellinger: It has been moved and seconded that these members be elected to membership in this Society. Any remarks? All those in favor signify by saying "Aye"; contrary; carried.

Dr. Carroll Smith: I have been authorized by the Executive Committee to propose two members for honorary membership, Dr. Pierce of Chicago, and Dr. Peter of Philadelphia.

Dr. Pischel: I second the motion.

President Mellinger: It has been moved and seconded that Dr. Pierce of Chicago and Dr. Peter of Philadelphia be elected to our honorary membership roll. All those in favor please signify by saying "Aye"; carried.

Secretary Hoffman: I am just going to offer a word of explanation here to those now present about the treasurer's report. It will appear for you to read in the transactions. You will notice, if you read it carefully, instead of covering one year from January 1, 1927, to January 1, 1928, I have brought it up to the date of the present meeting, and it covers from January 1, 1927, to March 31, 1928, which changes the aspect of the figures a little, but I thought it would be more in harmony to bring the fiscal year from meeting to meeting rather than from January first to January first, as has been in the past.

Dr. Wheeler: I move the report be accepted (Motion seconded and carried.)

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Statement of Cash Receipts and Disbursements of the Pacific Coast Oto Chithalmological Society Seattle, Washington.

January 10927, to March 31, 1928

BALANCE—National Bank of Commerce (Jan. 1, 1927)	\$3,130.57
RECEIPTS:	
Membership For and Dues	2,786.20
G	F 01 (77
E	5,916.77
EXPENSE	3,021.71
EXPENSE STORY S1,203.35 "Transactions" \$1,203.35	
Mississippi Flood Relief Fund 500.00	

300.00

"Transictions"
Wississippi Flood Receive arial Services...

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Stangarabia Corrigos	200.00
Stenographic Services	280.00
Spokane Meeting	182.88
Printing and Stationery	156.21
Stamps and Mailing	132.59
Electro Cuts	85.50
Telegrams and Telephone	62.07
Traveling - Spokane	44.65
Programs	31.50
Audit	25.00
Bank Charges	8.56
Office Supplies.	6.30
Committee Meeting Expense	3.10

BALANCE—National Bank of Commerce (Mar. 31, 1928).... \$2,895.06

Dr. C. Benson Wood: If it is not out of order, I would like to make a motion based on this. I have some knowledge of the difficulties the secretary has in getting out the transactions. Our transactions rarely get out before the wintertime following the meeting. A good deal of it is cold at that time, and I know what the difficulty is and it is largely due to the editing that each man who has a paper or discussion is to do. He is given the privilege to edit that himself, and it is sent to him and he takes his own good time about getting it back. Based on that, I would like to offer this motion, that the secretary be authorized to publish, edit himself, if necessary, the papers and discussions as of June first. In other words, that will give everybody from now to June first to edit and return their manuscripts, and if it is not done by that time, the secretary be authorized to edit and publish it as is.

Dr. Pischel: Second the motion.

President Mellinger: You have heard the motion. There is no reason for repeating it. Any remarks? Any discussion on the motion? All those in favor signify by saying "Aye"; contrain, carried.

Secretary Hoffman: Dr. Carroll Smith Circle attracted my attention to a little thing that might call for later difficism. One of these names I read, Dr. Blair, is not a possessor difficate from either board, but his application was on file before this ruling was in effect and it was overlooked at the last meeting, and I thought it only fair that he should have the opportunity come up for election. He paid his application fee prior to January 1, 1927.

President Mellinger: O Hampton, I want to present you with the gavel and hope for you euccess.

Dr. Robert R. Impton: Given the support you have had, I will be successful.

Dr. Mellingo: Our new president!

Dr. Holpan: On behalf of the members of the Society here and the mentions of the Society here only in spirit, I want to thank Dr. Mellinger and the men of Santa Barbara for one of the most excellent

meetings we have ever attended. I think we have held our meeting in the best ventilated and up-to-date meeting places and in the quietest and nicest hall we have ever met in. It has been one of the most pleasant meetings I have ever attended, with all due respect to all previous meetings.

Dr. Mellinger: It is indeed a great pleasure to have had you here, and the credit is due for the successful meeting to all who have taken part, and that includes every one—those reading papers and those coming a long way to attend. Everyone is a part of this meeting and, therefore, I wish to express my appreciation to everyone who has aided in any way in making this meeting a success.

Dr. Hampton: At this time I want the members to know that I appreciate greatly the honor given me and my city and my state, and I know that we will have a very successful meeting.

If there is no further business, the chair will entertain a motion to adjourn.

Whereon, the meeting adjourned at 2:20 P. M.

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THE GAVEL

At the Seattle session of the society in 1914 the presiding officer was forced to make use of a hard wood mastoid mallet in lieu of a gavel. Seeing the society's need he determined upon the presentation of a gavel at the next meeting.

The guest of honor that year was Col. Robert H. Elliot. Col. Elliot having held a glaucoma clinic in which he performed a number of sclerocorneal trephinings, it was an easy step to a glaucoma gavel and another easy step to asking Col. Elliot to participate in the presentation to the extent of furnishing the wood from which the gavel was to be made. Col. Elliot readily consented and in due time sent along the block of English Oak, which was obtained from Messrs. John Weiss and Son, of London. Accompanying the block was a short history which, in abstract, was about as follows:

"This block of wood was taken from a stock, to be used for fancy cutlery cases, obtained from piling removed from London Bridge when it was repaired a few years before. The piling had been placed beneath the piers of the bridge some time in the seventeenth century and had remained under water from that time on. When the piling was found to be as sound as it was when driven, Messrs. Weiss and Son recognized the sentimental and historic value that would be placed upon it by Englishmen and secured it for their stock rooms."

The gavel pictured on following page, was manufactured and engraved by Jos. Mayer and Bro., Manufacturing Jewelers of Seattle, Washington.

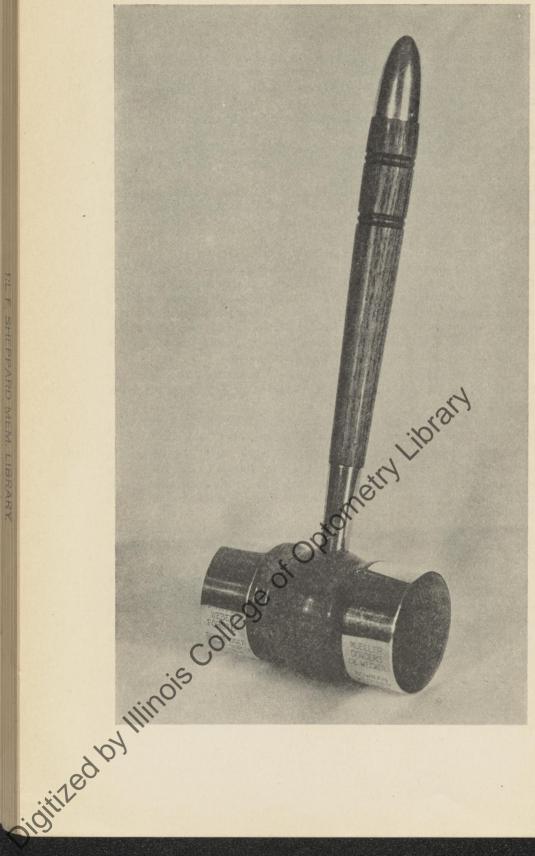
On the handle is engraved: "Presented to the Pacific Coast Oto-Ophthalmological Society by Robert H. Elliot and Ophton T. Cooke."

The names inscribed upon the silver mounting were selected from a large number of names of men who have contributed to our knowledge of glaucoma. Each one selected has been the author of some epoch making advance either in our understanding of glaucoma or in its therapeutic control.

At the presentation of the gave at San Francisco in 1915 Dr. Hayward G. Thomas, President neat speech, accepted it in behalf of the society.

Of Dr. Cooke's presentation speech the closing remark was: "May I indulge the hope, Sir, that whoever in the future wields this gavel will not fail to pay homate, not only to these men, but to all the great souls who have strugged with the problem of glaucoma in order to ransom mankind from a disease the dread outcome of which not even death itself has been more relentless and certain."

death itself has



CONSTITUTION AND BY-LAWS

ARTICLE I

NAME

The name and title of this Association shall be the Pacific Coast Oto-Ophthalmological Society.

ARTICLE II

OBJECT

The object of this Society shall be: the cultivation and advancement of Medical Sciences, in general, especially the branches which pertain to diseases of the Eye, Ear, Nose and Throat; to co-operate with the various County and State Medical Associations for the extension of medical knowledge, and the advancement of medical education, and to the enacting and enforcing of just medical laws; to the promotion of friendly intercourse among its members and to the guarding and fostering of their material interest; to the enlightenment and direction of public opinion in regards to the great problems of medicine and surgery, so that the profession shall become more capable and honorable within itself, and more useful to the public in prevention and cure of disease, and in prolonging and adding comfort to life; to purchase, receive, acquire, own and hold all such personal property as may be necessary or proper, or convenient, for carrying out the purposes of this organization.

ARTICLE III

MEMBERSHIP

Section 1. The Society shall consist of Active Tembers, Honorary Members and Guests.

Sec. 2. Active Members—Every respectable and legally qualified physician residing in the states of California, Oregon, Washington, Idaho, Montana, Arizona, Nevada, Utab and British Columbia, whose practice is limited to the Eye, Ear, Nos and Throat, and who does not support, practice or claim to practice sectarian medicine; who has a membership in good standing in a local County or District Society, and also a membership in good standing in his local Eye, Ear, Nose and Throat Section or Society where such Section or Society exists; who has had special training in one or more of the aforementioned specialties, to the equivalent of one or ar's work in Clinics or Post Graduate Schools, in which these special to are taught, shall be entitled to active membership, by complying th the rules and regulations of the Society as here-

membership shaded, accompanied by members present shall be necessary for elbeen approved by the Executive Committee. Sec. 3. Applications for membership shall be made in such form as shall be provided, accompanied by membership fee, in accordance with Article VIII. All elections shall be by ballot and four-fifths vote of all members present shall be necessary for election, applications having

Sec. 4. Applications from rejected candidates shall not be received within one year of such rejection.

Sec. 5. All active members shall be equally privileged to attend all meetings, and take part in all proceedings, and shall be eligible to any office or honor within the gift of the Society so long as they conform to these By-Laws, including the payment of dues to the Society, provided that no member under sentence of suspension or expulsion shall take part in any proceedings of the Society or be permitted to resign from the Society or be eligible to any office in the Society until relieved of such disability.

Sec. 6. All charges against a member shall be made in writing to the Executive Committee and the same shall be investigated at their discretion, and if found to be of sufficient moment, after the accused has been given the privilege of a hearing, shall be reported to the Society for action.

A member who has been found guilty of a criminal offense, or of gross misconduct, either as a physician or as a citizen, or whose license to practice medicine in his State or District has been revoked by the State Board of Examiners, or who has committed any act which may be derogatory to the medical profession, or who shall refuse or neglect to obey the regulations of this Society, or who has violated any of the provisions of these By-Laws, shall be liable to censure, suspension or expulsion, which censure, suspension or expulsion shall require two-thirds affirmative vote of the members present at a regular meeting.

Written notice of charges preferred must be given to the accused ten (10) days in advance of such meeting, and opportunity of accused to be heard in his own defense before a vote of the Society is taken on his censure, suspension or expulsion.

Sec. 7. Any physician who shall procure, for profit, a patent for a remedy or an instrument of surgery, or who salls, or who is interested in the sale of patented remedies, or nostrums, of shall give a certificate in favor of a patented or a proprietary remedy, or patented instrument, or who shall enter into agreement to receive pecuniary compensation, or patronage for sending prescriptions. Oany apothecary, or for sending orders to an instrument manufacturer or retailer or optical company, shall be liable to censure, suspension, or expulsion in accordance with Article III, Section 6 (it being the intent of this clause to prohibit the acceptance of rebates or commissions, but not to prevent a physician from selling to his patient drugs, appliances or spectacles or eye glasses, when in his opinion the patient's interest may be protected by so doing).

Sec. 8. The Code of Ethics of the A.M.A. is hereby adopted by this Society and shall be considered a part of the By-Laws of this Society.

Sec. 9. Distinguished physicians and others who are not members of this Society may be elected Honorary Members by a four-fifths vote of those present, but they shall not be entitled to privileges of active members. The lists of Honorary Members shall be published in connection with the membership rolls of the Society.

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Sec. 10. The Executive Committee may invite Distinguished Physicians and Members of Allied Sciences as Guests to read papers at any regular or special session of the Society. Such Guests shall have the privileges of participating in all scientific subjects which come before the sessions to which they have been invited.

ARTICLE IV

MEETINGS

Section 1. One meeting shall be held annually at such place as may be designated by a majority vote of members present at any regular meeting; the meeting place shall be selected one year in advance; the time of the annual meeting shall be fixed by the Executive Committee, which will be best suited to the climate and other facilities of the place selected for the meeting. Twenty members shall constitute a quorum.

Sec. 2. Special meetings may be called by the Executive Committee.

ARTICLE V

OFFICERS

- Section 1. The officers of the Society shall consist of a President, First and Second Vice-Presidents, Secretary-Treasurer and an Executive Committee of Five Members, which shall consist of the President and Vice-President, Secretary-Treasurer, and the two past Presidents. The President shall be Chairman of the Committee.
- Sec. 2. The President, Vice-President and Secretary-Treasurer shall be elected at the annual meeting. The Executive Committee shall nominate a full ticket from the active members of the Society. The election of officers shall be the first order of business, at the last general assembly of the annual sessions. Nominations to an elective office may be made in the general assembly. A majority of all votes cast is required for election.
- Sec. 3. The President shall preside at all meetings of the Society and Executive Committee, and have general supervision of all the affairs of the Society and enforce the rules and regulations thereof, and perform and discharge all the duties usually performed by a President of a Society.
- Sec. 4. The First Vice-President shall be a member of the Executive Committee, shall assist the President in the performance of his duties, shall preside in his abence and upon his death, resignation or removal from the district shall succeed to the Presidency.
- Sec. 5. The Secretary Treasurer shall be a member of the Executive Committee. He shall record the minutes of the Society and Executive Committee meetings. He shall receive and keep account of all dues and moneys belonging to the Society and shall pay out the same only upon the written order of the President. He shall give bond for the trust reposed in him and shall annually subject his accounts to examination by a certified accountant, the expense of both of which shall be paid from the funds of the Society.

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He shall notify each member of the Society as to the time and place of each meeting, and, whenever possible, give the program for the meeting. He shall make and keep a list of the members of the Society in good standing, noting of each his correct name, address, place and date of birth, place and date of graduation, and date of license to practice medicine in this district.

Sec. 6. The Executive Committee shall be the governing body of the Society and shall have full power and control of all the property of the Society, with the authority to sell and dispose of the same or any part thereof. It shall have the power to make such rules and regulations for the comfort and success of the Society as it may deem proper.

It shall have the power to remit the entrance fee of any member or his dues for a period of not more than one year following the date of such motion.

It shall have the power to extend the courtesies of the Society to non-resident visitors, to arrange for affiliation of this Society with other Societies and to decide all questions not governed and determined by the By-Laws. No funds shall be disbursed without the vote of the Executive Committee.

The Executive Committee shall meet at least once a year, such meetings to be determined by itself.

The Executive Committee shall examine and report on the qualifications of applicants for membership, subjecting each applicant to such examination as it may deem necessary, it shall investigate charges preferred against a member and report its conclusions and recommendations to the Society.

ARTICLE VI

COMMITTEES

Section 1. The incoming President, on taking his chair, shall appoint standing committees as follows:

A Committee on Program and Screenific Work. A Committee on Public Health and Legislation.

Sec. 2. The Committee on Program and Scientific Work shall consist of five members. It shall be its that to promote scientific and social functions of the Society by arranging attractive programs for each meeting.

ORTICLE VII

ONDS AND EXPENSES

Section 1. The parance fee, which must accompany the application, shall be five collars. The entrance fee shall be returned if the applicant is not accepted.

Sec. 2. The annual dues shall be \$5.00 for all active members, payable on Jainary 1st of each year, and if not paid before the 1st of July following the member shall be held as suspended from the Society, and his pain shall be placed on the list of non-affiliating physicians, and shall remain so until such disability is removed.

ARTICLE VIII

ORDER OF BUSINESS

The order of business shall be as follows:

- 1. Call to order by the President.
- 2. Reading of Minutes of last meeting.
- 3. Clinical cases and Pathological specimens.
- 4. Papers and discussions.
- 5. Unfinished business.
- 6. New business.
- 7. Reports of Committees.
- 8. Announcements.
- 9. Adjournment.

ARTICLE IX

RULES OF ORDER

The deliberations of this Society will be governed by parliamentary usage as contained in Roberts' Rules of Order, unless otherwise determined by vote. Papers by members shall be limited to twenty minutes' time, and the discussion to five minutes.

ARTICLE X

AMENDMENTS

This Society may amend any article by a two-thirds vote of its members present at a regular meeting and notice shall have been sent by mail to each member ten days in advance of the meeting at which final action is to be taken.

ARTICLE XI

APPLICATION FOR MEMBERSHIR

Beginning January 1, 1927, no application for members shall be received except from such individuals as have been certified to by the American Board for Ophthalmic Examinations or the National Board for Otolaryngology, with the exception of those physicians in good standing in practice thirty days or more

ANNUAL DUES AN ENTRANCE FEE
Section 1. The annual dues shall be Five Dollars for all active members, payable on Janua First. The entrance fee, which must accompany the application, shall be five dollars. The entrance fee shall be returned if the applicant is not accepted.

ANNUAL BANQUET

Sec. 2. The expense of the annual banquet will be met by a plate charge for each one participating with the exception of honorary guests.

EXPENSE OF MEETING

Sec. 3 The expense of the annual meeting shall be met by a five dollar (\$00) registration fee charged each member attending the anigitized by nual meeting.

MEMBERS OF THE PACIFIC COAST OTO-OPHTHALMOLOGICAL SOCIETY

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HONORARY MEMBERS

			HOHORIMI		
		Beck, Joseph C	Chicago, Ill.	Mosher, Harris P	Boston, Mass.
		Benedict, W. L.	Rochester, Minn.		Omaha, Nebr.
		Burch, Frank E.	St. Paul, Minn.		Detroit, Mich.
			EDenver, Colo.		Philadelphia, Pa.
			New York City	Spencer Frank	Boulder, Colo.
			London, Eng.		London, Eng.
			Boston, Mass.		Portland, Ore.
			Denver, Colo.		Baltimore, Md.
			Detroit, Mich.		Seattle, Wash.
		Fischer, Martin	Cincinnati, O.		Omaha, Nebr.
		Halstead, Thomas	Syracuse, N. Y.		Chicago, Ill.
		Hawley, C. W	Chicago, Ill.	Wilson, J. Gordon	Chicago, Ill.
			Boston, Mass.	Wood, Wm. L	Oracle, Ariz.
		Loeb H W	St. Louis, Mo.	Dr Pierce	Chicago, Ill.
77			New Orleans, La.	Dr Peter	Philadelphai, Pa.
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3		Robbitt O Miller		601 Medical I	Rida Portland Ora
25		Pailor Assessing D		1000 Callina I	Plde Portland, Ore.
4		Barley, Augustus B.		516 Setter St	Francisco Colif
		Barkan, A		510 Sutter St., S	Francisco, Calif.
R		Barkan, Hans		516 Sutter St., C	Francisco, Calif.
3		Barkan, Otto		516 Sutter St.,	San Francisco, Calif.
		Barton, John F			Kelso, Wash.
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8		Bell, Will Otto		Medical & Dental	Bldg., Seattle, Wash.
7		Bennett, W. W		Bradbury Bldg.	, Los Angeles, Calif.
K		Bentley, Frederick		Cobb I	Bldg., Seattle, Wash.
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		Blair, Faris M		817 Sur	nmit, Seattle, Wash.
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		Boucher, R. B	, 0	718 Granville S	t., Vancouver, B. C.
		Bouvy, Harry		800 Pittock	Blk., Portland, Ore.
		Bouvy, Lee B	600		La Grande, Ore.
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		Boyden, Guy L.	~	301 Stevens 1	Bldg., Portland, Ore.
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		Brazeau, Stephen D		old National Bank Bl	dg., Spokane, Wash.
		Briggs, G. A.	409 Farmers &	Mechanics Bank Blds	s., Sacramento, Caif.
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		Briggs, Wm. Ellery		1027 10th Ave	Sacramento, Calif
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		Brough Chac W		415 Flm	St San Diego Calif
		Brown Coo W	1029 I	Merchants Bank Bldg	Los Angeles Calif.
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Brown, John Mackenzie	
Browning, Andrew I	
Bruere Gustave E	Journal Bldg., Portland, Ore.
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Carkins, Jesse Wilbur	Federal Realty Bldg., Oakland, Calif.
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Cameron, Wm. G	Puget Sound Bank Bldg., Tacoma, Wash.
Campbell, Glenn	
Carruth, H. E.	716 Medical Arts Bldg., Portland, Ore.
Chamberlain, Chas. T	Journal Bldg., Portland, Ore.
Chase, Frank E.	Cobb Bldg., Seattle, Wash.
Chiapella, J. O	
Christensen, Eugene L	Old Dominion Bank Bldg., Miami, Ariz.
Christierson, Sigrud von	Fitzhugh Bldg., San Francisco, Calif.
Clark, Fred G.	Taft, Calif.
Clement, L. O.	Bank of Commerce, Salem, Ore.
Codd, A. N.	605 Paulsen Bldg., Spokane, Wash.
	Selling Bldg., Portland, Ore.
Cohn H. I.	Flood Bldg., San Francisco, Calif.
Comer Montie C	27 South Scott St., Tucson, Ariz.
Conlan F I	135 Stockton St., San Francisco, Calif.
Connell F Dowitt	Selling Bldg., Portland, Ore.
	Selling Bldg., Portland, Ore.
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Cordes, Frederick C	
Cowles, Calvin D., Jr	Overland Bldg., Boise, Idaho
Crane, Walter R.	Chapman Bldg., Los Angeles, Calif.
Cunningham, Henry M	
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Davies, Bertram C	Pacific Mutual Bldg., Los Angeles, Calif.
Davies, Josiah S	
Davis, Ralph F	Selling Bldg Portland, Ore.
Dayton, Glenn O	
Deane, Louis C	
Detling, Frank E	
Dickson, F. J.	
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Donovan, John A.	Phoenix Bldg., Butte, Mont.
Dow. Julian N.	River Strong Bldg., Los Angeles, Calif.
David James F	Doggett Donly Dida Calt Lake City Hitch
Dowling I T	Wireinia Mason Hospital, Seattle Wash
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Edwards, Frank A.	Hollingworth Bidg., Los Angeles, Calif.
Edwards, Jesse C	
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Erb, Carl M.	Herald Bldg., Bellingham, Wash.
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Fenton, R. A. S	Medical Arts Bldg, Portland Ore
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		Eastman Bldg., Boise, Bldg.
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	Jordan, P. A	210 So. First St., San Jose, Calif.
		Selling Bldg., Portland, Ore.
		Jones Bldg., Victoria, B. C.
		Medical Arts Bldg., Portland, Ore.
	Kirk, Josiah H.	Embarcadero Road, Palo Alto, Calif.
	Kistner, F. B.	Stevens Bldg., Portland, Ore.
	Kress, Geo. 11	Bradbury Bidg., Los Angeles, Cam.
	Lamkin Rurt R	
	Langley Elmer E.	Old National Bank Bldg., Spokane, Wash.
	LeCompte Edward Dexter	Boston Bldg., Salt Lake City, Utah
	Lefler, Anna B	Story Bldg., Los Angeles, Calif.
	Levengood, H. Wilson	Medical Bldg., Santa Monica, Calif.
	Lewis, Eugene R.	730 S. Catalina, Los Angeles, Calif.
	Lewis, Joseph Davidson	
BE B		Pacific Mutual Bldg., Los Angeles, Calif.
	Lucas, H. R	Selling Bldg., Portland, Ore.
	Lugar, L. L.	
	Lundvick, Cyril	704 St. Helen's Ave., Tacoma, Wash.
	Lupton, Irving M	Medical Arts Bldg., Portland, Ore.
	Lyster, Theodore C	
	Macbeth, Harry T	Cobb Bldg., Seattle, Wash.
	MacDougall, N. E	718 Granville St., Vancouver, B. C.
	MacWhinnie, A. M.	Securities Bldg. Settle, Wash.
	Magny, Charles A	Medical Bldg., Lo Angeles, Calif.
	Martin, Robert C	
	Marrow Edward E	
	McClelland F S	Consolidated Realty River Los Angeles Calif
	McClure Geo	1006 Franklin St Oakland Calif
	McCool Joseph L	Stevens Bldg. Portland Ore.
	McCov. Geo. W.	Secrity Bldg., Los Angeles, Calif.
	McCov. L. L.	817 Summit Ave., Seattle, Wash.
	McHugh, F. M.	Descret Bank Bldg., Salt Lake City, Utah
	McLoone, John J	Heard Bldg., Phoenix, Ariz.
	McNaught, Harvard	490 Post St., San Francisco, Calif.
	Means, P. C.	Consolidated Realty Bldg., Los Angeles, Calif. 1906 Franklin St. Oakland, Calif. Stevens Bldg., Portland, Ore. Stevens Bldg., Los Angeles, Calif. As 7 Summit Ave., Seattle, Wash. Des Bank Bldg., Salt Lake City, Utah Heard Bldg., Phoenix, Ariz. 490 Post St., San Francisco, Calif. 103 Michelterena St., Santa Barbara, Calif. 20 E. Sola St., Santa Barbara, Calif. 35 E. Second So., Provo, Utah Title Ins. Bldg., Los Angeles, Calif. Journal Bldg., Portland, Ore.
	Mellinger, William	120 E. Sola St., Santa Barbara, Calif.
15/20 18	Merrill, H. G	35 E. Second So., Provo, Utah
	Merrill, Harry Palmer	Title Ins. Bldg., Los Angeles, Calif.
	Miller, Frank W.	Pacific Mutual Bldg., Los Angeles, Calif.
		Chapman Bldg., Los Angeles, Calif.
		Fuller Bldg., San Bernardino, Calif.
		Pacific Mutual Bldg., Los Angeles, Calif.
	Morgan, James Albert	Young Bldg., Honolulu, T. H.
		Phoenix Bldg., Butte, Mont.
		Everett, Wash.
	Murphy, Albert B	Everett, wasn.
	Murph, Albert B	
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Neely Paul T	
Neery, Faul 1	Campbell Court Hotel, Portland, Ore.
Nener, Edward Manson	Boston Bldg., Salt Lake City, Utah
Nelson, N. C.	I. O. O. F. Temple, Eugene, Ore.
Neulin, E. Nelson	Medical Arts Bldg., Portland, Ore.
Nourse, Robert L	Boise, Idaho
Nutting Raymond I	
Traceing, Italy mond J.	
Oales I owis Wester	35 E. Second So., Provo, Utah
Oakes, Lewis Weston	35 E. Second So., Provo, Utan
O'Conner, Roderick R	1904 Franklin, Oakland, Calif.
Parkinson, Roy H	
Perry, Richard W.	Stimson Bldg., Seattle, Wash.
Petherain Charles C	Medical Arts Bldg., Portland, Ore.
Pfoutz Cilbert P	1136 East First So., Salt Lake City, Utah
D' 1-1 D.1	130 East First So., Sait Lake City, Utan
Pischel, Donrmann	San Francisco, Calif.
Pischel, Kaspar.	
Plummer, Copeland	817 Summit Ave., Seattle, Wash.
Pond, C. W.	Kane Bldg., Pocatello, Idaho
Pontius Nevin I.	Stimson Bldg., Seattle, Wash.
Price Merton	490 Post St., San Francisco, Calif.
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Pugmire, C. C. K.	Medical Arts Bldg., Salt Lake City, Utah
Pugmire, Le Roy	Eccles Bldg., Ogden, Utah
Rajotte, E. C. F.	Physicians' Bldg., San Francisco, Calif.
Raley, Franklin H	Boston Bldg., Salt Lake City, Utah
Reamer E E	Modesto, Calif.
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Reed, J. R.	Citizens Savings Bank Bldg., Pasadena, Calif.
Remington, Paul A	Old Nat'l Bank Bldg., Spokane, Wash.
Reynolds, Frank O	Logan, Utah
Ridges, A. J.	Walker Bldg., Salt Lake City, Utah
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Rogers, J. Lee	Old National Bank Bldg., Spokane, Wash.
Rott, Otto M.	Paulsen Bleg, Spokane, Wash.
Ryan, Albert F	Auditorium Bldg Los Angeles, Calif.
Samuels S Maimon	
Sacov H D	Everett Wesh
Scoler A C	Medical-Dental Bldg., Seattle, Wash. Everett, Wash. Roseburg, Ore. Stimson Bldg., Seattle, Wash. Medical Bldg., Oakland, Calif. Nampa, Idaho Medical Bldg., Oakland, Calif. Bradbury Bldg., Los Angeles, Calif. Wakefield Bldg., Oakland, Calif. 1102 Boston Bldg., Salt Lake City, Utah 600 Paulsen Bldg., Spokane, Wash.
Seelye, A. C.	Roseburg, Ore.
Seelye, Walter K	Stimson Bldg., Seattle, Wash.
Selfridge, Grant	
Sewall, Eward CSt	anford University Hosp., San Francisco, Calif.
Shannon, Claire W	Stimson Bldg., Seattle, Wash.
Sharpsteen Jay Randolph	3118 Webster St Oakland Calif
Shawhan Clann E	Nampa Idaha
Shawhan, Glenn E.	Malial Dila Olla 1 Calif
Shook, F. M.	Medical Bidg., Oakland, Calif.
Shumaker, Edgar K	Bradbury Bldg., Los Angeles, Calif.
Shutes, Milton H.	
Slopanskey, Frank Robert	
Smith, Carroll	600 Paulsen Bldg., Spokane, Wash.
Smith John Jacob	Flood Bldg., San Francisco, Calif.
Smith I so W	Cranita & Alaska Putta Mont
Smith Dishard	Granite & Alaska, Butte, Mont. ———————————————————————————————————
Smith, Kichard	Columbus Bldg., Superior, Wis.
Smith, Wallace Brude	
Spencer, Geo.	1005 Seventh St., Sacramento, Calif.
Sprowl, Frederick G	Paulsen Bldg., Spokane, Wash.
Sprowl, R.D.	Paulsen Bldg., Spokane, Wash.
Stauffer Fred	Deseret Bank Bldg., Salt Lake City, Utah
Stanfor F Lever	Descret Bank Bldg., Salt Lake City, Utah
Standar W Pareless	Modical Plda Alamada Calif
Stephen, W. Barciay	Medical Bldg., Alameda, Calif.

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Van Kirk, F. J	Judge Bldg., Salt Lake, UtahNational Bank Bldg., Bellingham, WashPaulsen Bldg., Spokane, WashPaulsen Bldg., Spokane, Wash.
Walker, Arthur W	
Walts, Manford R	1501 So. Figueroa St., Los Angeles, Calif. Medical-Dental Bldg., Seattle, Wash. 817 Summit Ave., Seattle, Wash.
Washburn, Benson Earl	
Welty, Cullen F	210 Post St., San Francisco, Calif. 305 Medical-Dental Bldg., San Diego, Calif. Twin Falls, Idaho
Wheeler, Ernest C	Rust Bldg., Tacoma, WashLoew's State Bldg., Los Angeles, Calif.
Wimp, W. H.	
Windnam, Robert E	Twohy Blog San Jose, Calif. Ashland, Ore.
Wood, C. Benson	Ashland, Ore. Merritt Bists, Los Angeles, Calif. 320 Stimson Bldg., Seattle, Wash.
Young, Grace	First Nath Bank Bldg., The Dalles, Ore.

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